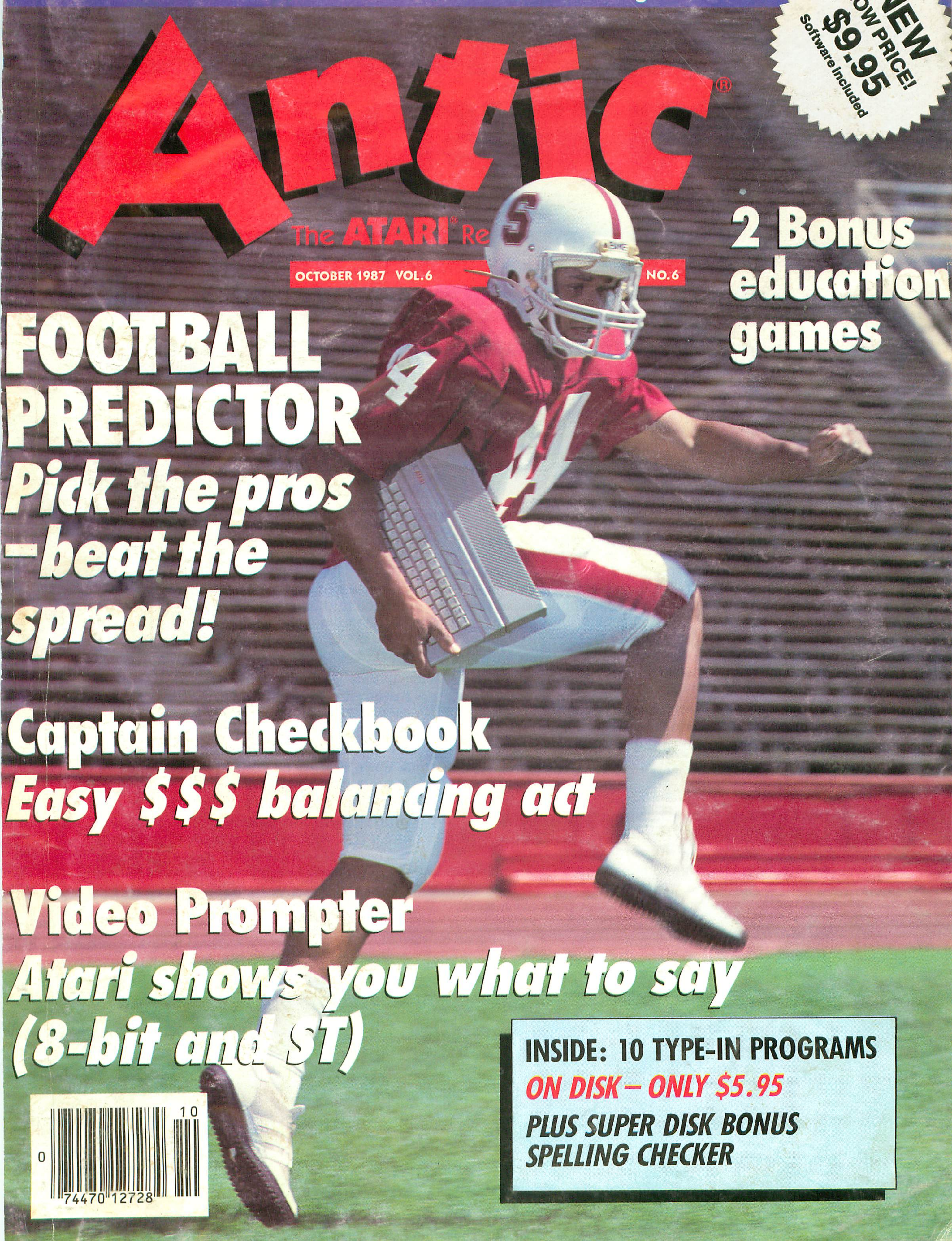
INCLUDING: ST PRODUCTS, PROGRAMS, NEWS, HELP Page 49

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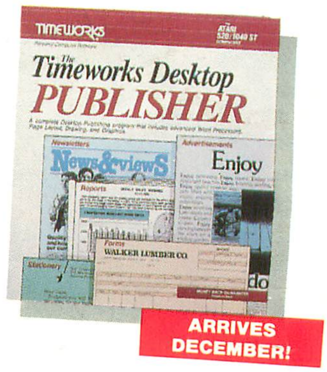
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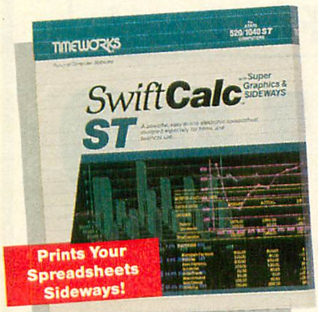
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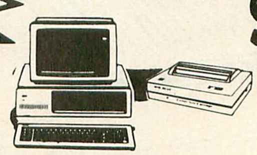
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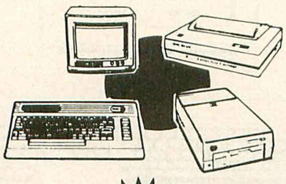
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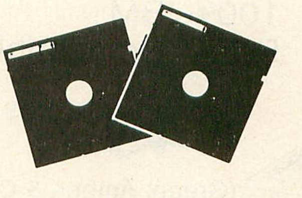
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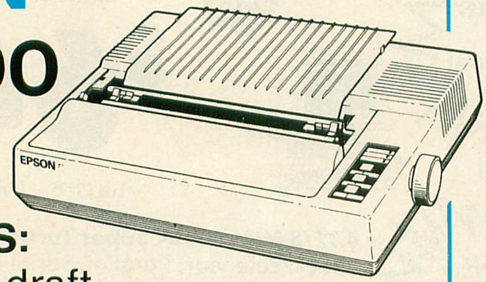
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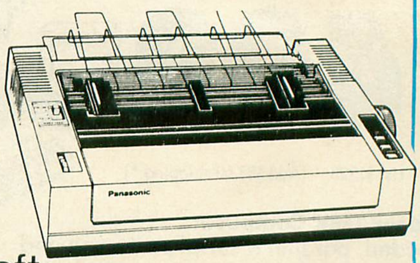


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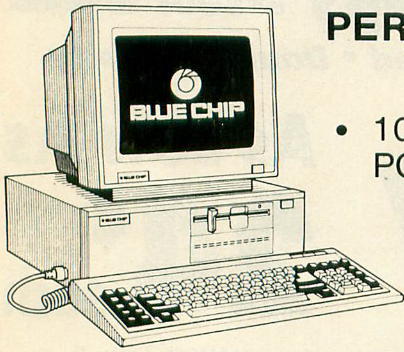
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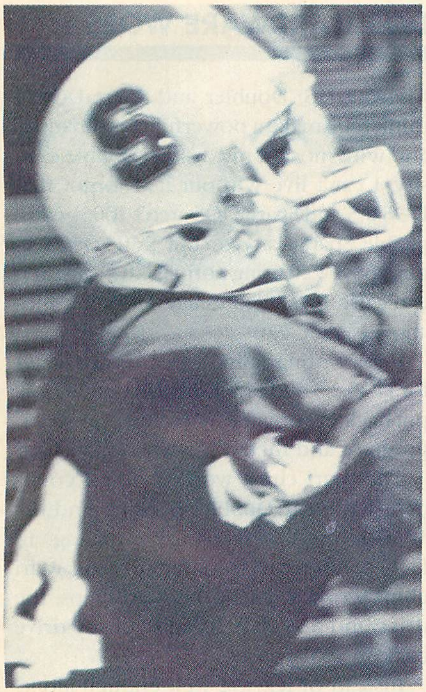
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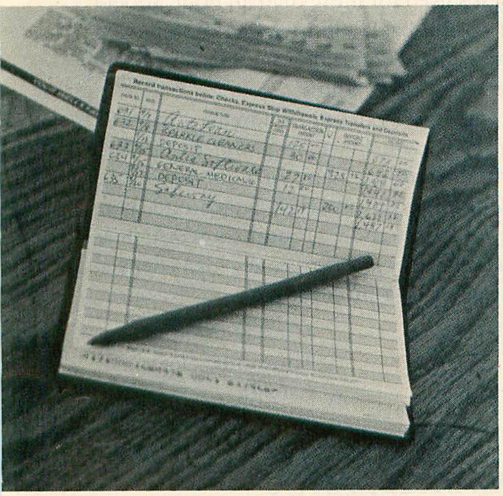
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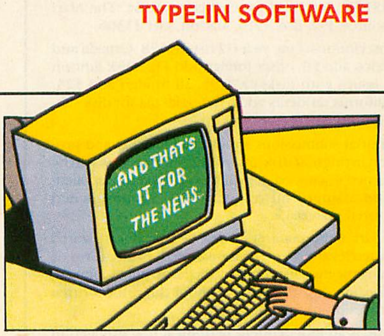


CHECKBOOK BALANCER/47

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DEPARTMENTS

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ST RESOURCE

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Editorial submissions should include text and program listings on disk and paper. Submissions will be returned if stamped, self-addressed mailer is supplied. **Antic** assumes no responsibility for unsolicited editorial material.

I/O Board

EZUSE UPGRADE

Thanks for the positive review of USA Construction Set (**Antic**, July 1987). We *do* listen to your comments and upgrade our products if we can. You made a legitimate complaint about having to go through the entire answer database to find the correct answer.

The program has now been enhanced so that three random answers, plus the correct one, are the only ones you have to look at. These will be displayed randomly so that the answer won't always be in the same order. Owners of the older version can receive a free upgrade by mailing their original disk to EZuse Software.

We wish the review had mentioned one of the highlights of the program—ability to print the USA Construction Set in quiz format. The data can be printed sequentially or randomly, as can a selected number. We learned from our Quizmaster Construction Set (reviewed in **Antic**, November 1986) that this is what the users want, especially the educators who bought it for class use.

Jan Iverson
EZuse Software
2850 Enea Way
Antioch, CA 94509

WHEN'S OPRAH ON?

At the television station where I work, my engineering department is responsible for recording numerous programs which are delivered via satellite. Every so often, one of the engineers would forget to record a show. This caused all sorts of grief as other (more expensive) arrangements had to be made to obtain the show before the scheduled air time.

Last year, after hearing of yet another show that wasn't recorded on time, I decided something had to be done. Thus was born the Weekly Event Timer, a BASIC program that generates an obnoxious noise to warn us of an impending show to be recorded. What better way to use my Atari at work?

Richard Kihn
Chief Engineer,
KFDM-TV
Beaumont, TX

DOS HARDWARE WOES

I have a U.S. Doubler and SpartaDOS. I think they make a powerful combination, and with most of my disks at double density, I can't live without it. I forgot that DOS 2.5 and SpartaDOS aren't 100% compatible. Sparta can *read* but NOT *write* sectors above 720 using normal CIO calls. You can't use ERASE to delete DOS 2.5 files above sector 720.

I was writing a disk-dependent program for DOS 2.5 and I foolishly thought I'd just put back my original Atari chips, finish the program and then re-insert the Doubler.

The Atari chips worked fine. I confidently put the Doubler back in, and my 1050 refused to recognize anything. In fact, neither the Doubler *nor* the Atari chips worked. I sent the Atari chips, the drive and $65 to Atari and got my drive back in two weeks.

Instead of leaving well enough alone, I put the Doubler back in. It worked, but now my drive fails frequently, especally if it's used for more than an hour. Should I send it back and lose two more weeks and another $65? Buy another drive? Skip town? I don't know.

But I will offer the following advice: Be *very* careful if you're going to install a modification to any of your hardware. Ground your hands by attaching a wire to yourself and a ground source such as a cold water pipe. Be gentle—or, better yet, leave it to a professional.

Mack McLeod
Thornhill, Ontario
Canada

WANTED: ANTIC REVIEWERS

Antic has freelance assignments for reviewers of Atari 8-bit adventures (text or graphics) and fantasy role-playing games. If you are an experienced gamer in either of these categories and can write well, send the Antic Editor a letter about yourself plus a sample of your writing.

We can only consider you for an assignment after seeing some of your writing. If you don't have any relevant writing samples on hand, just write us a review of a game that you know well.

OVERSEAS PACKING

How can I safely ship my disks overseas? Will airport security X-rays affect them? How can I keep the heat and cold which may be encountered during shipping won't hurt them?

F.D. Keel
Las Vegas, NV

Camera shops and some computer stores sell lead-foil bags. Sealing your disks inside these bags should take care of all those problems.—ANTIC ED

BANK STREET HELP

I read Kenny Hom's problem with Bank Street Writer (I/O Board, **Antic**, June 1987). I also have an old version of Bank Street Writer—it won't boot with Atari BASIC revisions B or C. However, it works well with revision A (and a translator on an XL or XE). Another program that requires revision A is Diskey from Adventure International. Diskey is about 90% compatible with revisions B and C, however.

I also have a debugged version of revision A BASIC on disk. I've been unable to boot Bank Street Writer or Diskey with my disk-based BASIC. Is there any way to do this?

Charles Campbell
Indianapolis, IN

COACHWARE WANTED

I'm a high school football coach interested in drawing football plays—mostly involving X's, O's and arrows—with my 800XL and sending them to my Star SG-10 printer. I thought that the Atari light pen might work, but I couldn't find compatible software. So I'm wondering about drawing with the joystick. I'm at an impasse and could use help.

Jerry Culver
Livingston, CA

WHITE HOUSE BANKRUPTCY

White House Computer of Williamsport, Pennsylvania unexpectedly went out of business and filed for bankruptcy. Unfortunately, a number of **Antic** readers have not received goods for which they paid White House. If you are in this situation, contact Postal Inspector Riley, P.O. Box 3747, Scranton, PA 18505-3747.

During the past five years, the overwhelming majority of mail order companies advertising in **Antic** have provided outstanding service and values. However, readers should know that federal postal regulations require mail-order sellers to deliver your purchased goods within 30 days after receiving your order. If you don't obtain your mail order purchase in 30 days, you are entitled to seek action by filing complaints with your local Postmaster General and Better Business Bureau.

MARGINS FOR ERROR

I have an Atari 1200XL, a 1050 disk drive and a 1027 letter quality printer. The printer has "automatic" margins, and when I set margins with the First XLEnt Word Processor, the margins on the printout are 20 columns further in on each side. I've found that I must set margins with [◤][F]lm-10, [◤][F]rm+9. (I have to use "9" in the right margin because the 1027 won't accept lines longer than 80 characters—so I have to send 79 per line.)

Augusto Poitevin
Luquillo, Puerto Rico

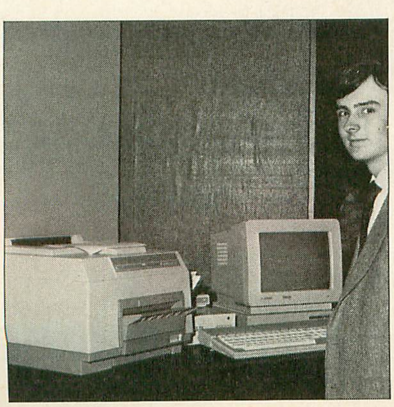
We don't currently have a 1027 printer to test this with. However, we'd be interested in knowing if other 1027 owners have this problem with First XLEnt.—ANTIC ED

Help!

ANTIC DATABASE

The manual for Antic dataBASE (August 1987 Super Disk Bonus) appeared on disk in shortened and somewhat garbled form. The complete, corrected manual (42 sectors) is on the October 1987 Antic Disk and can be accessed from the Help Menu—Selection 5 on Side A. Or you can download the manual from the Error Log section of ANTIC ONLINE on CompuServe. ■

Atari Desktop Publishing



Newest prototype of the Atari Desktop Publishing System is demonstrated at the June, 1987 World of Atari Fair in Santa Clara, California by Mark Jansen of Atari R&D. The interface box can be glimpsed between the Atari laser printer and the 4Mb Mega ST. ■

Antic welcomes your feedback, but we regret that the large volume of mail makes it impossible for the Editors to reply to everyone. Although we do respond to as much reader correspondence as time permits, our highest priority must be to publish I/O answers to questions that are meaningful to a substantial number of readers.

Send letters to: Antic I/O Board, 544 Second Street, San Francisco, CA 94107.

We didn't mean to set the world on fire.

Honestly, we'd be the first to tell you that if *all* you're interested in are Adventures, stick with your usual brand of software. Simulations only? Keep reaching for them in the same familiar packages! But if you enjoy entertainment software, you probably enjoy the excitement of a whole range of challenges — Adventures and Strategies for long rainy weekends, Arcade games for exhilarating evenings, Simulations when you need to get away from it all. For people like you, Firebird offers top-quality entertainment software in virtually *every* category.



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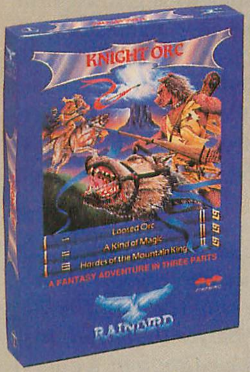
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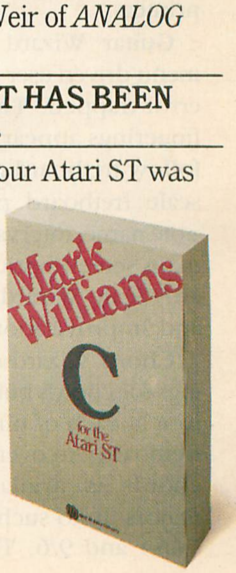
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CIRCLE 021 ON READER SERVICE CARD

GUITAR WIZARD

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1001 Medical Park Drive S.E.
Grand Rapids, MI 49506
(616) 957-3036
$24.95, 48K disk
CIRCLE **150** ON READER SERVICE CARD

Reviewed by Jim Pierson-Perry

Hunched over my Atari keyboard, I stared at the screen, my faithful six-string in hand. Staring back in smug innocence was a graphic rendering of various ways to produce a D minor chord up and down the fretboard. Even the guitar strings seemed amused as I tried to assume the finger-position for yet another attempt at this vicious series of inversions. Did Chuck Berry really start this way?

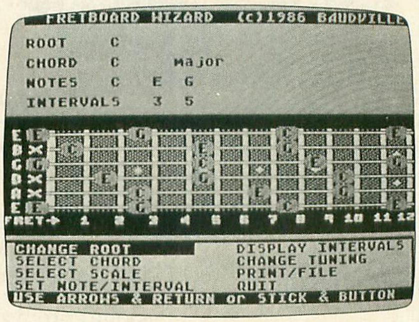
That pitiful scene was caused by working with **Guitar Wizard**, an innovative self-instruction program for mastering guitar chords and scales. At its most basic, this program is a computerized chord-fingering book. But it goes far beyond that to include scale guides and suggestions for improvisational playing, as well as delving deep into alternate string tunings. You can also print the current chord/scale on Epson, Star/Gemini, or Okidata printers.

Guitar Wizard has a convenient menu-driven user interface that is well error-trapped. The chord and scale fingerings appear on a large, easy-to-follow fretboard graphic. The chord/scale fretboard positions can show note name, interval, or fingering. The main screen options are Chord Wizard, Scale Wizard, Fretboard Wizard and Improvisation Wizard.

Chord Wizard displays the fingerings for chords built on any chromatic root at each of nine positions on the fretboard. An overwhelming range of chords is available, from simple majors up to such esoteric modes as 7sus4 and 9/6. There are 32 chord types, along with more than 12 roots and nine positions, totaling 3,456 variations.

Scale Wizard shows the fingering for 19 different scales built on any chromatic root at any of nine positions on the fretboard—another 2,052 variations. Available scales range from majors and minors to the Greek scales and Blues.

The above choices assume you're using a six-string guitar with standard tuning. If you're adventurous, a special option is available which presents chord/scale fingerings for non-standard tunings. Fretboard Wizard lets you create any tuning and find either a chord or scale. The computer shows all fretboard variations you can pick



from. This is a very powerful feature for advanced study that is seldom described in standard guitar theory books.

Improvisation Wizard helps you select notes that would blend with harmonizing chords the rest of a band might play. An obvious use is to help develop solos to go with a background chord progression. Pick a root note and chord—the program then displays a list of appropriate scales.

Overall, I like this program both for personal use and for its potential as a home study tool for a guitar course. However, there's no sound with the instruction, just the fretboard fingering graphics. It would be nice to have the option of listening to the sound of a chord or scale that's on display.

Is this program for everyone? If your only interest is holding a C major fuzztone for a heavy metal riff, you can probably get by without it. But if you're actually interested in learning how to play and are willing to put in the practice hours, Guitar Wizard will help. Guitar instructors also should seriously consider using this software for homework or advanced theory lessons.

LINKWORD LANGUAGES

Artworx Software Co., Inc.
1844 Penfield Road
Penfield, NY 14526
(716) 385-6120
$24.95, 48K disk
CIRCLE **170** ON READER SERVICE CARD

Reviewed by Heidi Brumbaugh

"Imagine yourself having a drunken argument about whether trout is spelt with FOUR L'S."

"Huh?" I said. But when the question "What is the English word for FORELLE?" popped up on the screen a few minutes later, I knew at once that the answer was "trout." Using images that link foreign words to acoustically similar English words is a technique called imagery.

I'd heard about this method, but as a veteran of language study I'd never used it—and was highly skeptical. However, having memorized 20 animal names *and* their genders after 10 minutes with the German version of Gruneberg's **Linkword Language Series**, I was completely converted. It was so satisfying to learn so quickly that I had to tear myself from the computer when it was time to stop.

The Linkword series is also available in French, Italian and Spanish. Promised soon are Russian, Portugese and Greek versions. Words are introduced one at a time, with the computer giving the English word, foreign equivalent, phonetic spelling and quick image to keep in mind for each. As with the trout example, the images are often bizarre but usually effective.

After 10 words, the program quizzes you. Then you use the same technique to learn the genders, and take another quiz.

Far from being a simple vocabulary program, Linkword also teaches the beginning elements of grammar. These sections were less impressive, however. The program introduces grammar in a "this means that" manner, rather than fully explaining concepts such as verb conjugation and noun declension. For example, the program tells you that the German word for *are* is *sind*, except when using the informal form of *you*, in which case it's *bist*. Mainstream foreign language texts almost always teach these verbs with a table of the pronouns and their corresponding verb forms.

The course covers such topics as dining out and going to the doctor, and teaches vocabulary ranging from clothes and furniture to business and travel. Parts of speech such as verbs and adjectives are interspersed, as is the grammar, throughout the 10 lessons.

At the end of each lesson, you must translate complete sentences. These exercises increase in complexity as you learn more grammar. The sentences incorporate words from previous lessons, thus reinforcing your vocabulary.

The program comes with an audio cassette featuring a native speaker pronouncing the words you've just learned. The audio section is optional, but I found it a very good supplement.

My main complaints with the program concern the drills. The sentence translations at the end of each lesson were good practice, but at times I thought there should have been more of them. You can't repeat these drills without going through the entire lesson again.

The main problem, however, is that the program doesn't keep track of the words you miss. Even though words from previous lessons are repeated throughout, there is no way to add special emphasis on trouble spots. You also can't add your own vocabulary words, which makes it impossible for educators to customize lessons.

Because the program is easy to use, the short manual tells you only what you need to know to begin. The manual also has a complete glossary of the words in the course and even includes a short section on helping your child learn a language. However, the contents of the lessons aren't fully indexed. For example, if you want to go back and repeat the lesson on telling time, the manual doesn't tell you that it's buried in the restaurant section.

The program is geared toward home use, and constant interaction with the computer makes it more active than the book-and-cassette home language courses available. Although I thought the grammar lessons weren't very well presented, the speed with which vocabulary can be memorized made up for it. The package boasts that you will learn a vocabulary of 400 words in 10 hours—and if you're serious about learning a foreign language, don't balk at the claim. With Gruneberg's Linkword method and a little dedication, you'll be ready that European vacation for in no time.

ULTRA-SPEED, ULTRA MENU

Computer Software Services
P.O. Box 17660
Rochester, NY 14617
For XL/XE (except 1200XL)
Ultra Menu/DOS: $29.95
Ultra-Speed: $49.95
CIRCLE **151** ON READER SERVICE CARD

Reviewed by Charles Cherry

Ultra-Speed, a replacement operating system chip for XL/XE computers, is designed to work with most 8-bit disk drive modifications to provide high-speed disk access with virtually all software.

Your keyboard speed is doubled—a real blessing for many programs. You now have all 40 screen columns to work with, and the colors have been changed slightly for more contrast. The [OPTION] key must now be held down for BASIC while booting. Pressing [HELP] and [RESET] produces a true coldstart—the same as turning the computer off and back on. This is invaluable with expanded memory because it doesn't erase the RAMdisk.

The chip has a piggyback socket and switch soldered to it, which lets you switch between the normal operating system and Ultra-Speed. To install the Ultra-Speed chip, you pull out the Atari operating system chip, plug in the Ultra-Speed and plug the operating system chip into the piggyback socket. The switch reaches to the back of the computer, where you drill a hole and mount it. (Take care to protect these fragile parts from static electricity and physical damage. And of course, opening up the case of your Atari voids the warranty.)

If your Atari's operating system chip happens to be soldered in place, the procedure becomes much harder. Desoldering the operating system chip is not a trivial operation. Overheating any of the 28 pins will destroy the

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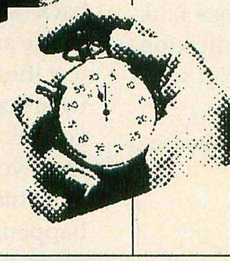
Navarone's high speed interface.

Navarone combines the Canon IX-12 Image Scanner with it's own High Speed Interface that plugs into the cartridge port of the Atari ST.

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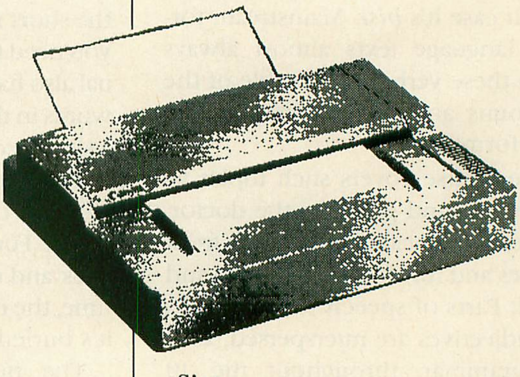
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Gray Scale
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Interface
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Size
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Weight
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230V AC 50Hz 70W
240V AC 50Hz 70W
System Requirements (minium)
Atari 520 ST, mono or color monitor, disk drive
Output File Format
DEGAS, PostScript, .IMG(standard GEM)

For more information please call:
1-800-654-2821 (in California)
1-800-624-6545 (nationwide).

NAVARONE

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chip, and overheating the traces on the circuit board can also damage it. Fortunately, C.S.S. will install the chip for you for free—and within 24 hours. I strongly recommend taking advantage of this service.

Of course, there are always problems when you change an operating system. Some programs may not work with the Ultra-Speed. For example, the international character set has been deleted to make room for the Ultra-Speed handlers, and programs that use international characters won't work.

Ultra-Speed generally requires that disks must be formatted with the Ultra-Speed chip itself, meaning that you can't speed up the loading of protected disks although you may be able to speed up data disks.

Now that I have Ultra-Speed, I wonder how I got along without it. If you have a modified disk drive (especially if you also have a large RAMdisk), Ultra-Speed is a necessity. Even if you don't have any souped-up hardware, Ultra-Speed is useful. The enhancements may seem minor, but they greatly increase the pleasure of computing with the 8-bit Atari.

Ultra Menu/DOS provides easy access to many DOS functions. However, it has a curiously unfinished feel. It doesn't stay in memory while you run a program, so you must reboot it constantly. It's smart enough to know the difference between BASIC and machine language programs, but it crashes if it tries to load a text file as a BASIC program. It supports only four drives and no RAMdisk, but is compatible with many machine language programs.

Ultra Menu is at its best when copying files. You don't need to type the filename, just pick it from the directory. You can have auto-formatting and multiple copies, and you can copy between single-density and double-density. The DUP DISK command does a complete sector copy.

But even the copy utility is limited. There's no way to specify several files to copy, not even with wild cards (though you can specify all the files on a disk).

Ultra Menu's copy protection scheme is so bizarre that I can't let it pass without comment. The disk must have its write-protect tab removed in order to run, which is just inviting trouble.

The program does not support high-speed transfers on modified drives, so you can't use it with the excellent Ultra-Speed operating system, which does. Still, Ultra-Menu/DOS has the makings of a useful product and I hope C.S.S. will develop it more fully. ■

By Robin Alan Sherer

Atari Animation

Lesson 5: Introducing Bit-Mapping

This series for intermediate BASIC programmers explains how to make Atari graphics move. But any 8-bit Atari user with minimum 32K memory, disk or cassette, can enjoy the short BASIC type-in graphics demonstrations accompanying each lesson.

Everything you see onscreen, whether text or graphics, is represented at the lowest level by bits which turn on or off. Each memory location in RAM can hold a number from 0 to 255. These numbers are stored by bits numbered 0 to 7 in each memory location. To create text and graphics onscreen, the computer's designers built programs into the computer telling it how to interpret those bits.

GRAPHICS 8

Graphics 8 is easier to understand than other graphic modes. The screen is divided into a grid of 320 dots across and 192 dots down. Each dot can be turned on or off. In Graphics 8, each bit in screen memory represents a dot. Turn a bit on or off, and the corresponding dot responds exactly the same way.

Because each byte has eight bits and each line is 320 dots across, it follows that each Graphics 8 *line* contains 40 bytes. That's a total of 7,680 bytes of screen memory (40×192).

Since one byte holds eight dots instead of one, turning individual bits on and off can be frustrating (especially from BASIC). Another complication is color. You have a choice of two—on or off, 0 or 1, blue or white, background or foreground.

Giving a bit a value of 1 turns it on, and 0 turns it off. White is the foreground color—in which the letters are drawn in BASIC—and blue is the background color.

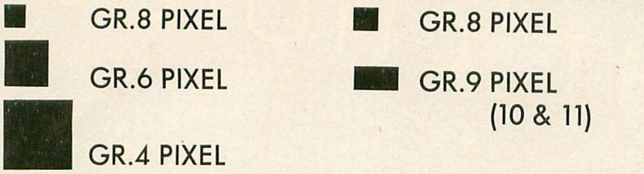
In BASIC, if we forget to set colors, then the machine uses built-in **defaults**—in this case, blue for background and white for foreground. To change these colors, either use the SETCOLOR command or POKE colors directly into the memory locations that hold the color information. Rarely will you want to change all of this directly. It's much easier to PLOT and DRAWTO.

GRAPHICS MODE SUMMARIES

DISPLAY TYPE	SCREEN SIZE (COLUMNS×ROWS)	MEMORY USED (BYTES)	DEFAULT COLORS	SET COLORS (N)	POKE ADDRESS	COLOR (N)
TWO SHADES OF ONE COLOR						
GRAPHICS 8	320×160 SPLIT 320×192 FULL	8112 SPLIT 8138 FULL	LIGHT BLUE	1	709	1
			DARK BLUE	2	710	0
			BLACK	4	712	BORDER
TWO COLORS						
GRAPHICS 4	80×40 SPLIT 80×48 FULL	MODE 4 694 SPLIT 696 FULL	ORANGE	0	708	1
GRAPHICS 6	160×80 SPLIT 160×96 FULL	MODE 6 2174 SPLIT 2184 FULL	BLACK	4	712	0
FOUR COLORS						
GRAPHICS 3	40×20 SPLIT 40×24 FULL	434 SPLIT 432 FULL	ORANGE	0	708	1
GRAPHICS 5	80×40 SPLIT 80×48 FULL	1174 SPLIT 1176 FULL	LIGHT GREEN	1	709	2
			BLUE	2	710	3
GRAPHICS 7	160×80 SPLIT 160×96 FULL	4190 SPLIT 4200 FULL	BLACK	4	712	0

GRAPHICS 4 AND 6

As in Graphics 8, the dots in Graphics 4 and 6 can be either on or off. The difference is the larger sizes of dots in GR. 4 and 6. Screen memory in these modes works



the same way as in GR. 8, but there can be fewer of those big GR. 4 and 6 dots onscreen. Thus less screen memory is needed, which gives you more room for your program and data.

GRAPHICS 3,5 AND 7

In these Graphics modes, not only can the pixels be on, but they each can have one of three colors—meaning *four* possibilities per pixel, not just two. But the catch is that we use *two* bits per pixel instead of one. So in the four-color modes, each byte of screen memory holds four dots instead of eight. Here's how they can be arranged:

BIT PATTERN	USES COLOR
00	0
01	1
10	2
11	3

These two bits tell your Atari chip which color to give a particular dot, but how does it know what the four colors are? After all, the Atari has 256 of them to choose from. As in Graphics 1 and 2, we use the four color registers. The difference, however, is that the bit combinations don't refer to the same color registers as they did for the characters.

BITS	REGISTER	LOCATION
00	background	712
01	0	708
02	1	709
03	2	710

BIT MAPPING

Now we are ready to explore what can be done with bit-mapped graphics modes.

You have seen that computer graphics is essentially getting bits turned on and off in the right places. Depending on the graphics mode you choose, these bits will be "translated" to the screen as pixels of varying sizes and color.

The only practical use for straight BASIC in drawing and PLOTting is to create backgrounds. We want to create shapes and make them flow gracefully enough to appear lifelike. We can either move our background—a city, mountains, etc.—or our players—cars, spaceships, people, etc. But you can animate any of these faster and more powerfully from BASIC with machine language subroutines.

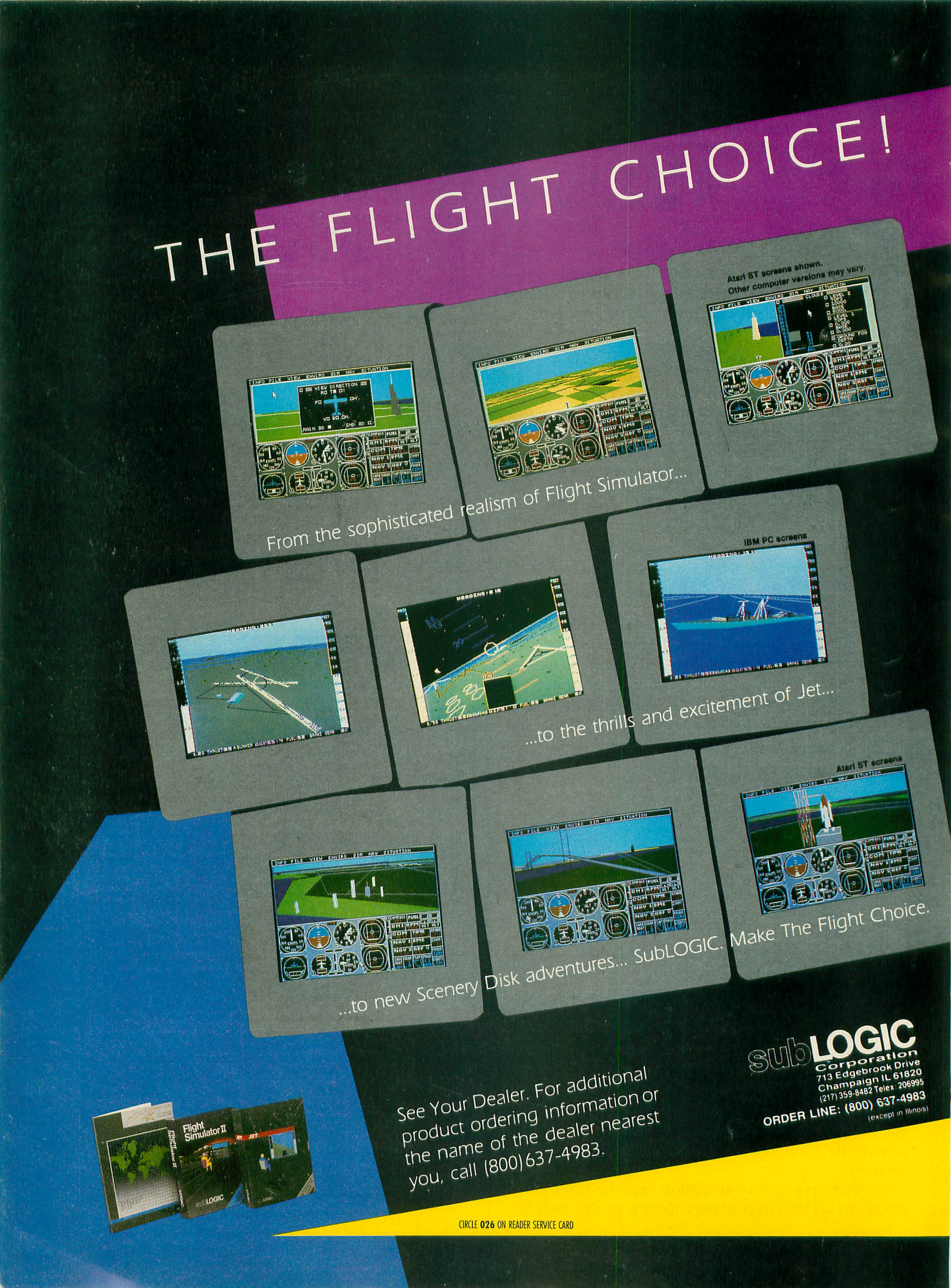
Another approach to animation uses the PLOT command. To get the effect of movement with this method, you must PLOT a point, erase it, PLOT it again one place over, erase it and so on. The following program draws an orange dot that you can move with the joystick.

```
1000 REM ATARI ANIMATION, LESSON 5,
    DOT.BAS, PART 1
1010 REM BY ROBIN SHERER
1020 REM (c)1987, ANTIC PUBLISHING ...
...
1030 GRAPHICS 4:POKE 764,255
1040 V=STICK(0)
1050 SETCOLOR 2,0,0:COLOR 2
1060 Y=Y+(V=13)+(V=9)+(V=5)-(V=10)-(V=
14)-(V=6)
1070 X=X-(V=10)-(V=11)-(V=9)+(V=6)+(V=
7)+(V=5)
1080 IF X<1 THEN X=1
1090 IF X>79 THEN X=79
1100 IF Y<1 THEN Y=1
1110 IF Y>39 THEN Y=39
1120 COLOR 1:PLOT X,Y:IF PEEK(764)=255
 THEN 1040
```

In this first example program, the dot leaves a trail—we're not so much animating as drawing. To get the desired effect, we must erase the trail by plotting the exact same shape using the background color in the same position once occupied by the orange dot. Below is a different method. Type it in as an addition to the previous lines.

```
10 REM ATARI ANIMATION, DOT, PART 2
1060 IF V=14 THEN Y=Y-1:PLOT X,Y+1
1065 IF V=13 THEN Y=Y+1:PLOT X,Y-1
1070 IF V=11 THEN X=X-1:PLOT X+1,Y
1075 IF V=7 THEN X=X+1:PLOT X-1,Y
```

continued on page 19


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CIRCLE 026 ON READER SERVICE CARD

The difference between the two dot routines is subtle, but important. It lies in the way the programs use the X and Y variables.

In the first example, X and Y contain the *current* position of the dot. In the second example, X and Y contain the *previous* position of the dot. And if we know the previous position of the dot, we can erase its trail.

Also, you can only move the joystick horizontally or vertically. To move it diagonally, you'd need several more program lines.

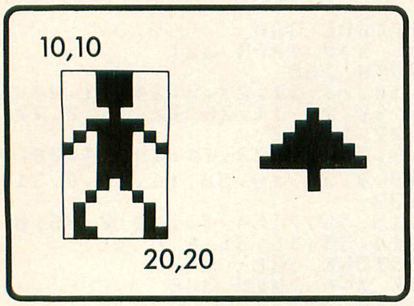
PLOTting can be tedious, especially if you have a lot of points to plot. Here's an example:

```
5 REM ATARI ANIMATION,    LESSON 5
 BITMAN.BAS
10 REM BY ROBIN SHERER
15 REM (c)1987, ANTIC PUBLISHING
20 GRAPHICS 5+16
30 COLOR 1:RESTORE 60
40 READ X,Y:IF X=0 THEN 102
50 PLOT X,Y:GOTO 40
60 DATA 9,23,10,23,11,23,9,24,10,24,11
,24,10,25,8,26,9,26,10,26,11,26,12,26,
7,27,9,27,10,27,11,27,13,27
70 DATA 6,28,9,28,10,28,11,28,14,28,9,
29,10,29,11,29,9,30,10,30,11,30,9,31,1
1,31,8,32,12,32,7,33,13,33,7,34,13,34
80 DATA 7,35,8,35,9,35,13,35,14,35,15,
35,0,0,0
102 COLOR 0:RESTORE 60
103 READ X,Y:IF X=0 THEN 120
104 PLOT X,Y:GOTO 103
120 REM
150 COLOR 1:RESTORE 190
170 READ X,Y:IF X=0 THEN 211
180 PLOT X,Y:GOTO 170
190 DATA 9,23,10,23,11,23,9,24,11,24,1
0,25,8,26,9,26,10,26,11,26,12,26,7,27,
9,27,10,27,11,27,13,27
200 DATA 7,28,9,28,10,28,11,28,13,28,9
,29,10,29,11,29,9,30,10,30,11,30,9,31,
11,31,9,32,11,32,8,33,12,33
210 DATA 8,34,12,34,8,35,9,35,10,35,12
,35,13,35,14,35,0,0
211 COLOR 0:RESTORE 190
212 READ X,Y:IF X=0 THEN 230
213 PLOT X,Y:GOTO 212
230 REM
270 COLOR 1:RESTORE 300
280 READ X,Y:IF X=0 THEN 321
290 PLOT X,Y:GOTO 280
300 DATA 9,23,10,23,11,23,9,24,11,24,1
0,25,8,26,9,26,10,26,11,26,12,26,7,27,
9,27,10,27,11,27,13,27
310 DATA 6,28,9,28,10,28,11,28,14,28,9
,29,10,29,11,29,9,30,10,30,11,30,9,31,
11,31,8,32,12,32
320 DATA 7,33,13,33,7,34,13,34,7,35,8,
35,9,35,13,35,14,35,15,35,0,0,0
321 COLOR 0:RESTORE 300
322 READ X,Y:IF X=0 THEN 340
323 PLOT X,Y:GOTO 322
340 REM
380 COLOR 1:RESTORE 410
390 READ X,Y:IF X=0 THEN 432
400 PLOT X,Y:GOTO 390
410 DATA 9,23,10,23,11,23,9,24,10,24,1
1,24,10,25,8,26,9,26,10,26,11,26,12,26
,7,27,9,27,10,27,11,27,13,27
420 DATA 7,28,9,28,10,28,11,28,13,28,9
,29,10,29,11,29,9,30,10,30,11,30,9,31,
11,31,9,32,11,32,8,33,12,33
430 DATA 8,34,12,34,8,35,9,35,10,35,12
,35,13,35,14,35,0,0
432 COLOR 0:RESTORE 410
433 READ X,Y:IF X=0 THEN 450
434 PLOT X,Y:GOTO 433
450 REM
460 GOTO 30
```

continued on next page

Even this takes a while to draw. Fortunately we already saw that using character sets was much quicker and gave an almost cartoon-like quality to the shape. But bit-mapped Graphics modes *can* be used for nice backgrounds.

ORIGINAL SCREEN



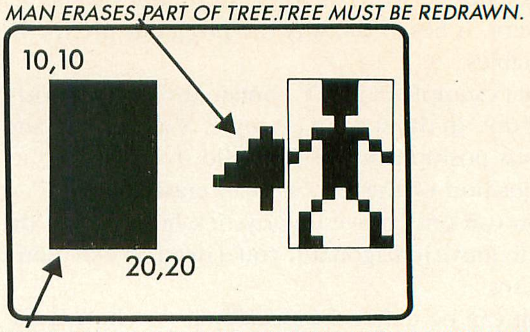
BIT-MAPPED MODES

The best way to use a graphics mode in a program is to use a graphics editor to draw the entire screen, then SAVE it to disk. When your program needs that screen, you can bring up the data quickly and place it right into the correct memory area for screen data.

The idea of moving characters around the screen isn't much different from cutting and pasting paper shapes. First you must define a set of dots, then instruct the computer with a machine language routine to move all dots between, for example, screen coordinates 10,10 and 20,20.

Great, but what if the "box" we placed our picture in had part of another shape in it? Then you must tell the computer, via another machine language routine, to put those dots at a different location. The only practical way to cut out a shape is with a box that surrounds it. Fill any holes with background color.

MAN ERASES PART OF TREE.TREE MUST BE REDRAWN.



HOLE WHERE MAN WAS.MUST FILL WITH BACKGROUND COLOR.

The disadvantages of animating with memory move routines are subtle. If part of your picture resides outside the area you have moved, that portion will stay put. Also, the area that is moved will overwrite everything in the area where it's placed.

The only solution would be to write a complicated machine language routine to store the picture we're cutting out before the shape messes it up, then restore it after the shape moves across the background. Since this must be done for each pixel in the "box," it can be very complicated.

However, the best way to animate small shapes is with

Player/Missile graphics—which will be introduced in later lessons.

GRAPHICS MODE TEXT

Adding text to Graphics modes is handy for everything from game scores to business chart labels. The following examples look at the character set in RAM, take apart the bits for the desired letters, and "paint" them onto your graphics screen.

```
2 REM M8TXT.BAS
4 REM BY ROBIN SHERER
6 REM (c)1987, ANTIC PUBLISHING
10 DIM TEXT$(4),HOLD$(1)
20 TEXT$="TEST":X=5:Y=20:REM (CHANGE T
O Y=10 FOR GR.4)
30 GRAPHICS 8+16:SAVMSC=PEEK(88)+PEEK(
89)*256:WIDTH=40
40 POKE 710,0
50 SCRN=SAVMSC+Y*WIDTH+X
60 FOR Z=1 TO LEN(TEXT$)
70 HOLD$=TEXT$(Z,Z):GOSUB 140
80 CHAR=PEEK(756)*256+TEMP*8
90 FOR ROW=0 TO 7
100 POKE SCRN+ROW*WIDTH,PEEK(CHAR+ROW)

110 NEXT ROW:SCRN=SCRN+1:NEXT Z
120 COLOR 1:PLOT 10,10:DRAWTO 40,40
130 GOTO 130
140 TEMP=ASC(HOLD$):IF TEMP>127 THEN T
EMP=TEMP-128
150 IF TEMP>31 AND TEMP<96 THEN TEMP=T
EMP-32:RETURN
160 IF TEMP<32 THEN TEMP=TEMP+64
170 RETURN
```

Line 20 contains the string you want to plot, and the X,Y position to place it in. Remember to use the same limits as the Graphics modes you're in.

Line 30 finds the start of screen memory and places this address into SAVMSC.

Line 40 sets the background color.

Line 50 calculates where to start placing data in the screen memory.

Lines 60-70 and the useful subroutine at 140-170 break down the characters to their position internally in the Atari's ROM character set. If internal codes matched ASCII codes, this wouldn't be needed.

Line 80 checks the Character Base Register (location 756, $02F4) to find the start of the character set. This routine will work with your own redefined character sets, too. (See Lesson 3, Antic, Aug. '87, for more information on redefined character sets.)

Lines 90-110 break down the eight horizontal "layers" of the character and POKE it directly into memory.

Line 120 plots a line to show you we aren't faking anything. Your screen really has letters and graphics overlapped.

To change the routine for Graphics 4 or 6,change the Graphics mode number (line 30) from 8 to 6 (or 4). Then, change **NUMCOL** (line 30) from 40 to 20 (for Graphics 6) or 10 (for Graphics 4). If you're using Graphics 4, you'll also have to change the instruction **Y=20** to **Y=10** in line 20.

FLAPPING BIRD

This month's demonstration listing combines the short routines from the article. It draws a flapping bird which you can control with your joystick. It is a very simple, bare-bones example that you'll find easy to understand and modify.

Type in Listing 1, VBIRD.BAS, checking it with TYPO II, and SAVE a copy to disk before you RUN it. When RUN, VBIRD draws a simple mountain scene in Graphics 8. Then, the listing uses routines from M8TXT.BAS to successively plot the "v", "^" and " " characters, giving the illusion of a flapping bird. We've also borrowed the animation routines from the DOT routines to allow you to move the flapping bird up and down. ■

RECOMMENDED BOOKS

Your Atari Computer by Lon Poole. Osborne/McGraw-Hill, 2600 Tenth Street, Berkeley, CA 94710. (415) 548-2805. $17.95, 474 pages.

Mapping the Atari by Ian Chadwick. Compute! Publications, Inc. (ABC), 825 Seventh Avenue, New York, NY 10019. (212) 887-5928. $16.95, 272 pages.

Robin Sherer co-wrote four Atari programming books. He presently programs for Boeing in Seattle.

Listing on page 72

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Game of the Month

By Chuck Rosko

Resistors

Action game teaches binary and electronics

It's not easy to be an electron and take care of your business on a challenging circuit board. Enter the world of Resistors and see for yourself. This BASIC program works on any 8-bit Atari computer with a minimum 48K memory, disk or cassette.

Here is your chance to play the role of a charged-up electron on a challenging journey through a vast, complex circuit board. Resistors won't exactly teach you the fundamentals of electronics. But it does convey an overall sense of how the various elements of a circuit work together—as well as giving you practice in converting binary numbers to decimal. And the game is a lot of fun to play.

During your travels through this scrolling circuit, you'll contact a variety of resistors, diodes and capacitors. As an electron, your job is to match the target number displayed at the bottom of the screen. This is done by charging the correct combination of diodes—each of which contains a different binary number. All charged diode numbers are added together and automatically converted to their decimal equivalent. This sum is displayed at the bottom right of the screen. If you can form the correct target number, your job is complete and it's on to the next round.

To get on the circuit, type in Listing 1, RESISTOR.BAS, check it with TYPO II and SAVE a copy before you RUN it.

If you have trouble typing the special characters in lines 1005 and 19010, don't type them in. Listing 2 will create them for you. Type in Listing 2, check it with TYPO II, and SAVE a copy. When you RUN Listing 2, it creates these hard-to-type lines and stores them in a disk file called LINES.LST.

Figure 1

DIODE	VALUE	BINARY VALUE	DECIMAL VALUE
7	2^7	10000000	128
6	2^6	01000000	64
5	2^5	00100000	32
4	2^4	00010000	16
3	2^3	00001000	8
2	2^2	00000100	4
2	2^1	00000010	2
2	2^0	00000001	1

To merge the two programs, disk users LOAD "D:RESISTOR.BAS" and then ENTER "D:LINES.LST". Remember to SAVE the completed program before you RUN it.

Cassette users: Follow the onscreen prompts after you RUN Listing 2.

GAME PLAY

At the start of each round, a random decimal number from 1 to 255 is displayed in the lower left corner of the screen. The circuit board is then "soldered" with random placement of the various resistors, diodes and capacitors. The complete circuit is made up of 10 rows and 12 columns, but only a small portion of this can be seen at one time.

You'll start each round at a random location in the top row. To move around the circuit, simply press your joystick up for north, down for south, left for west, or right for east. You cannot move diagonally.

There are four different types of resistors, each marked with a specific number number of vertical lines—zero, one, two or three. Each type of resistor blocks your electron from moving in *one* of the four possible directions.

MARKINGS	OPEN	BLOCKED
0 LINES	N, S, W	E
1 LINE	S, W, E	N
2 LINES	N, W, E	S
3 LINES	N, S, E	W

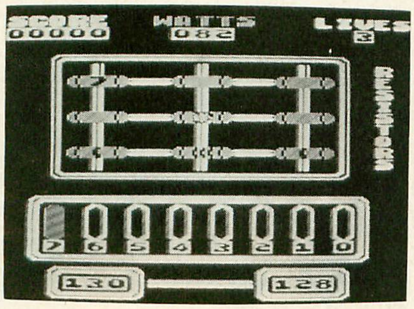
To make your journey a little more challenging, the circuit constantly changes. Every time you leave a resistor, it randomly converts to a different type. Sometimes this works to your advantage by opening up a blocked pathway. At other times it could block your path. Once inside a resistor, you won't be able to see its markings. If you can't remember what type you're in, press your joystick button and the markings will become visible for a few seconds.

DIODES

There are eight different types of diodes and only one of each type. They are marked by the numbers 0 to 7. These numbers indicate the charge that each diode holds—expressed as a power of two! The diode marked by a 7, for example, contains a charge of 27, or 128 (10000000 in binary).

For example, to match a target number of 170 (or 10101010 in binary), you'd have to discharge diodes numbered 7, 5, 3 and 1. *Figure 1* will help you remember the value of each diode.

The diodes can be in a charged or uncharged state. They are always uncharged at the start of each round. When you move to an uncharged diode, it becomes charged. The binary number it holds (indicated by its markings) is transmitted to a microprocessor and automatically converted to its decimal equivalent. It is then added to your total and displayed in the lower right corner.



In contrast, if you move to a diode that's already charged, the number it holds will automatically be subtracted from your total. The diode will then lose its charge. The seven vertical indicator lights beneath the circuit show the present state of each diode. A charged diode is solid and an uncharged one is hollow.

It should now be apparent why the target number can only go up to 255. If you charge all the diodes and add up their decimal equivalents, you get 255. Depending on the combination of diodes charged, you can form any number from 1 to 255.

CAPACITORS

You electrons don't have an endless supply of energy. You start each round with 99 watts. Every time you attempt to move, even if that direction is blocked, you'll use up one watt. You can increase your wattage by moving to a capacitor.

A capacitor is hollow and contains no markings. You'll start each game with nine capacitors, decreasing by one with each successive round until you only have one left. Once you enter a capacitor, you have the potential to gain as many as 20 watts. This is because the maximum wattage our electron can hold is 99. After a capacitor is discharged, it turns into a resistor.

SCORING

You'll receive one point for every watt remaining after you complete your assigned target number. So the less energy you use, the higher your score. You start each game with three electron lives and lose one every time your charge drops to zero.

To get high scores, you must remember the directions blocked by each type of resistor. You'll also need a good understanding of binary numbers and how to convert them to decimal. So if you don't already understand binary/decimal conversions when you start playing Resistors, this game will give you some valuable practice.

PROGRAM TAKE-APART

5-10	Start-up routines.
20-90	Various subroutines.
105-160	Reads the joystick for direction of move.
170-200	Moves the electron.
255-285	Finds resistor value, adds it to total and checks for a win.
300-330	Increases wattage for being in a diode.
500-515	Wattage is zero, deletes one electron and checks for end of game.
525-545	Game over subroutine.
1000-1025	Correct answer, increases score and generates new circuit.
19000-25042	Redefines character set.
26000-26035	Draws main screen.
26050-26100	Initializes variables, picks target number and starting position.
26300-26320	Setup scrolling routine.
26399-26440	Setup circuit board.
26515-26660	Randomly plots resistors, diodes and capacitors
31000-31040	Title screen. ■

Chuck Rosko, 29, is a microbiologist from Pittsburgh, Pennsylvania. He has been programming in Atari BASIC and machine language for five years, specializing in educational games.

Listing on page 74

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By Gregg Pearlman, Antic Assistant Editor

ACENET Boosts User Power

17 SoCal groups join forces

The first Atari Fair probably would not have happened in September 1986 at the Glendale Civic Auditorium, if not for ACENET—the consortium of 17 Southern California users groups between Santa Barbara, San Diego, Riverside and Long Beach. A 1987 Southern California Atari Fair is now scheduled for September 19-20 at the Glendale Civic.



ACENET first met in September, 1985. Its president is John King Tarpinian, a gregarious IRS agent who is also the president of the Hooked On Atari Computer Keyboard Society (HACKS) in North Hollywood. The ACENET officers meet approximately every three months.

Tarpinian had written to Atari Chairman Jack Tramiel about the possibility of a fair. After Atari Users Group Coordinator Sandi Austin called to tell the HACKS president that Tramiel says yes, Tarpinian met with Atari executives including Jack Tramiel; Sig Hartmann, Executive Vice President of Business Development; and Neil Harris, Marketing Communications Director.

Atari put up the front money for the convention hall and other major expenses, and ACENET was to repay them from the profits. If the show lost money, the groups would not owe Atari anything. "It worked beautifully," says Tarpinian.

At the April 1987 West Coast Computer Fair in San Francisco, ACENET demonstrated several current products at its booth, including the QMI laser printer and the BTL hard disk (reviewed in **Antic**, April 1987).

"ACENET got started because the competition between various clubs here became detrimental for no good reason," says Tarpinian. "It turned out that individual clubs regularly shared members. In fact, probably 20% of ACENET members belong to at least two clubs. So now each club tells its members about other nearby clubs. Somewhere down the line we plan to take the 'best-of' articles from all the individual club newsletters and produce a quarterly magazine."

HACKS' phone number is the same as ACENET's. Tarpinian's best "guesstimate" is that ACENET has about 5,000 members. Some clubs count individual memberships and others count family memberships. Membership numbers range between 60 and 300. There's no one huge users group in the greater Southern California area.

The original 11 clubs in the consortium have almost doubled in size since the beginning. "We hadn't found the other clubs yet," says Tarpinian, "and some even thought they were too small to be included in ACENET. They didn't know what we were about." Few clubs in the area don't belong to ACENET now.

ACENET has more white-collar workers than blue-collar workers, says Tarpinian. "I've got three or four chiropractors. Two members are computer company marketing reps who actually sell other brands of computers." Most members are in their late 20s or early 30s.

ST users make up 90% of the new members. "Most clubs have 8-bit and ST SIGS," says Tarpinian. "Some have programming SIGS. We're compiling a 40-page 'Introduction to Your Atari' booklet. Each club will get a master to copy for their new members."

continued on next page

ACENET
ATARI COMPUTER ENTHUSIASTS NETWORK
CHARTER MEMBER

HACKS

The HACKS 8-bit SIG has a 6502 programming class taught by Mark Manyen of Software Toolworks, who wrote Golden Oldies (reviewed in **Antic**, May 1987).

The HACKS newsletter is eight pages long. Its editor, club vice president Kitts Anderson, finds the material for the articles at the meetings. Then another member, Lew Marchese, "who just happens to own the largest graphics/art shop in Los Angeles, does all the paste-up and typesetting for free," says Tarpinian. "So we can afford to have it offset-print on a heavier bond paper. People really notice the newsletter because it looks so good. I send a copy to about 300 manufacturers every three months.

ACENET itself does not have a BBS, but most of the clubs do. HACKS' official systems are Magic Castle for the 8-bit, run by Dave Evans—which is where you'll often find Robert Jung (*A-Rogue*, **Antic**, May 1987)—and Infinity for the ST. And another BBS, ST Jungle, has been added. Officers from the other clubs have access to all three.

The Infinity BBS, run by Mark Krynsky, is supported jointly by ACENET and Logical Choice, an Atari-only store in North Hollywood. "We have a symbiotic relationship with that store," says Tarpinian.

HACKS SURVEY



About 70 of HACKS' 160 members attend the general meetings. Most ACENET clubs get about 40% attendance at meetings, according to Tarpinian. HACKS membership has increased about 5% a month—that's a net increase, taking into account the attrition rate.

"I'd say that the HACKS membership is 45% ST, 55% 8-bit, with about 20% having both," says Tarpinian. "At the Atari Fair, 2/3 of the attendees were 8-bit users. The vendors discounted the software a little, and the people were delighted. When the 8-bitters saw a decent selection for a change, they went nuts with their credit cards. The retailers were tickled pink."

Only about 10% of HACKS members use hard disks, mostly because of the prices. Everyone else uses floppy drives—Tarpinian says he doesn't know anyone who still uses cassettes.

The most popular floppy drive is the 1050, and the most popular printers are Epsons and their clones. On the 8-bit, the 1030 and XM301 are the most popular modems, and the Avatex is the most popular on the ST.

The online services used most often are CompuServe and Genie. Bulletin board systems are probably used even more. "PC Pursuit has opened up a new world for people," says Tarpinian. "For a flat $25 a month, they can call any public BBS in the nation. Those that have it swear by it, and I really think it's helped." (More details about about PC Pursuit in this issue's Communications department.)

The main 8-bit programming languages are BASIC and assembly, and C is most widely used on the ST. About 25% percent of HACKS members are programmers, and about half have more than rudimentary programming knowledge. Perhaps 10% of HACKS members do hardware projects.

In order of importance, here's what HACKS members use their Ataris for:

1. Word Processing
2. Telecommunications
3. MIDI
4. Finance
5. Games
6. Education
7. Programming

"We have several members over 60 years old," says Tarpinian. "They do a lot of work with genealogy programs."

MIDI enthusiasts are prevalent too—several professional musicians live in the area. "There's a MIDI-only computer store down here called MIDI City," says Tarpinian. "For MIDI, the Macintosh tended to be the machine of choice—for those with money. For the next level of musician, those who make a living at it but don't necessarily have money to burn, the ST is the one. Programs cost less for the ST, and the musicians don't have to buy so much add-on hardware.

"A musician named Charles Faris helps our MIDI SIG. Nobody's heard of him, but he has 87 gold albums and 35 platinum albums—he does all the in-house arranging for John Williams and George Lucas. Hybrid Arts, the makers of MIDImate, help us out too."

DEALING WITH ATARI

"I've had no problems with Atari—but I've learned that if you need something, you should phone them first and *then* send the request in writing. Then everything runs relatively smoothly," Tarpinian says.

Tarpinian deplores the lack of Atari software (especially 8-bit) in stores. "But at the fair, Logical Choice found out how rabid the 8-bit users are. They now keep at least 100 8-bit titles in their store."

PIRACY

"Someone once called me and said 'I'd like to buy a copy of FORTRAN,'" says Tarpinian. "I said, 'Well, we're a computer club, not a retail store.' 'No, no, no,' he says, 'I want to buy a *copy*.' I said, 'That's illegal.' He said, 'So?' I just hung up on him. First time I'd *ever* had someone do that."

That summarizes the basic feeling of HACKS—and ACENET in general—about software piracy. "Our club has

some CIA agents as members," says Tarpinian. "If you're caught pirating, you'll get booted out. But I've never had a problem at a club meeting. So many of our members make their living from the computer industry, and piracy does nothing but hurt it. The people who were 14 when they bought their first computers are 23 or 24 now, and they've grown up. I just get angry with copy protection because I can't put a protected program on my hard disk."■

ACENET CLUBS

Atari Anonymous (AA), Upland. (714) 624-7975

Atari Computer Association of Orange County (ACAOC), Fountain Valley. (213) 691-0107

Canejo Valley Atari Users Group. (805) 499-7723

Electronic Resources Atari Users Group (ERACE), Escondido, San Diego County. (619) 489-9872

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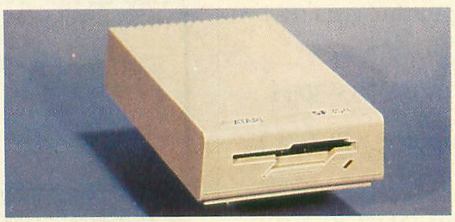
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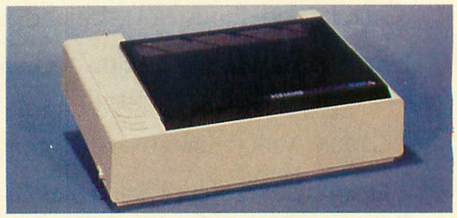
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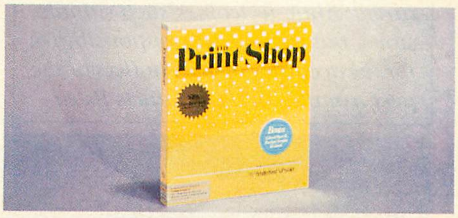


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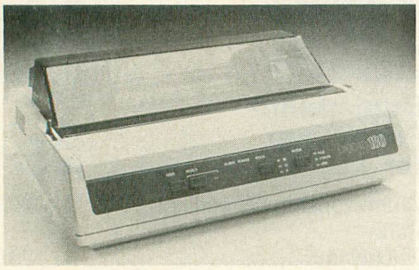
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CIRCLE 010 ON READER SERVICE CARD

New Products

By Gregg Pearlman, Antic Assistant Editor

New Products notices are compiled by the **Antic** *staff from information provided by the products' manufacturers. Antic welcomes such submissions, but assumes no responsibility for the accuracy of these notices or the performance of the products listed.*



OKIDATA 180

(printer)
Okidata
532 Fellowship Road
Mount Laurel, NJ 08054
(800) OKIDATA—National
(609) 235-2600—New Jersey
$329
CIRCLE **163** ON READER SERVICE CARD

Billed as a "universally compatible" dot-matrix printer, the **Okidata 180** boasts speeds of 180 characters per second in draft mode (7×9 dots per character), 120 cps (9×9) in utility mode and 30 cps in NLQ, as well as 10, 12 and 17 characters per inch. The printer features enhanced, emphasized and expanded print, superscripts, subscripts and underlining, and bit-image graphics to 144×288 dots per inch. Line feed and form feed are condensed into a single button on the front panel.

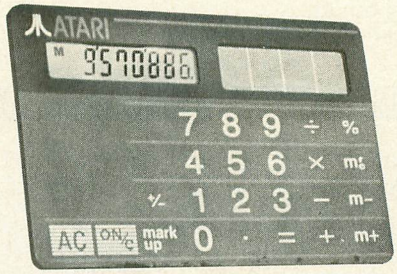
CYCLE KNIGHT

(entertainment software)
Artworx Software
1844 Penfield Road
Penfield, NY 14526
(800) 828-6573—National
(716) 385-6120—New York
$19.95, 48K disk
CIRCLE **156** ON READER SERVICE CARD

Far off in a mystic land where the knights ride laser-equipped motorcycles, the brave Sir Robby must rescue his kidnapped queen and several of her loyal subjects. There are plenty of deadly creatures and formidable obstacles to overcome—thank goodness for your weapons. One minute you might go *mano-a-mano* with the dangerous Black Knight, and the next minute you might have to barter with lords, serfs or guards for equipment or passage (or your life), using a "language" simulator. **Cycle Knight** features more than 2,000 castle chambers (and you can create your own castles), five skill levels and one-player to four-player operation.

ATARI-LOOK CALCULATOR

(pocket calculator)
Hardtech USA
8341 East Evans Road, Unit 106
Scottsdale, AZ 85260
(602) 483-1991
$3.95
CIRCLE **155** ON READER SERVICE CARD

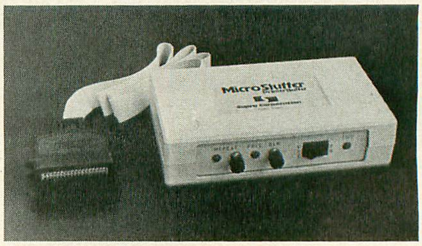


These solar-powered calculators are the size of a credit card—only 1.8 millimeters thick. They feature the Atari name and logo (licensed by Atari Corp.). When you go to a restaurant after a users group meeting, impress your friends by pulling this baby out to figure everybody's share of the check. More expensive models print out calculations (DMP 2000, $14.95) or have databanks (DB 2100, $17.95).

MICROSTUFFER

(print buffer update)
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Albany, OR 97321
(503) 967-9075
$69.95
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lets you work while your printer prints both text and graphics, and it's compatible with most parallel printers, including Epson, Star Micronics, Okidata and Panasonic.

XR 100 BAR CODER

(inventory software)
Xenia Research
P.O. Box 4675
Federal Way, WA 98003
(206) 927-7018
$159.95, 48K disk
CIRCLE **164** ON READER SERVICE CARD

With the **XR 100 Bar Code Reader** program, you can add the option of Code 39 bar code input (sometimes called "3 of 9") to most software—usually without having to modify the existing program. The XR was designed to be as compatible as possible with most existing languages and disk operating systems.

To accomplish this, the program is provided in two forms: BARL.COM, which automatically locates itself to the lowest available memory, and BARH.COM, which locates itself to the highest available memory. The program contains a digital "wand" which plugs into joystick port 1. (This isn't the type of wand that reads UPC symbols in grocery stores—those require a laser scanner. Code 39 is used by the Federal Government and large companies such as Lockheed.) ■

Return the favor. When you call a manufacturer or supplier about a product you've seen advertised or otherwise mentioned in ANTIC, please tell them so. This will help us to continue to bring you the latest information about products that will make your Atari computer an even more valuable investment in the future.
—ANTIC ED

By Paul Lay

Graphics Impossible

Antic imports Britain's best

Here are two eye-popping demonstrations of graphics techniques often mistakenly considered impossible—mixed vertical display lists, and dual players on the same horizontal line. You can use these powerful subroutines in your own BASIC programs and MAC/65 assembly language source code is also included. These BASIC program work on all 8-bit Atari computers of any memory size, with disk or cassette.

Any experienced 8-bit Atari user has learned that these computers are incredibly versatile. But there are some things most users believe the Atari can't do. For example, if you're a graphics programmer, you probably know that display lists can be mixed *horizontally* by building a new display list. But just ask some experts if you can combine different graphics modes *vertically* across the screen and they'll say it can't be done.

The two programs presented here will show that the Atari is even more versatile than some experts think.

Both of our programs use Graphics 8 because it's one of the most consistent graphics modes as far as direct memory access time (DMA) is concerned.

(DMA refers to the way the ANTIC chip "steals" cycles from the 6502 chip in order to draw the display screen. When you turn off the ANTIC chip with POKE 559,0 DMA is disabled and your program will run 15%-30% faster. However, your screen will be black. —ANTIC ED)

All Atari graphics modes are more DMA-consistent than text modes. In fact, every scan line uses the same amount of DMA time except the two LMS (Load Memory Scan) lines—the first of which is two machine cycles ahead of a normal scan line while the second is three cycles ahead. We must take account of these differences in our timing loop.

GRAPHDEM

Our first listing, GRAPHDEM.BAS, proves that you *can* mix Graphics 8 and 9 vertically and there's no reason you can't change the program to include Graphics 10 or 11. So type in Listing 1, GRAPHDEM.BAS, check it with TYPO II and SAVE a copy before you RUN it.

This program generates a screen consisting of a Graphics 8 vertical margin down the left side, with the rest in Graphics 9. The normal four-line horizontal Graphics 0 text window is also retained. With this arrangement you can draw graphs in 16 intensities, neatly labeled with 40-column text.

The mix is created by changing the value in PRIOR (a GTIA mode selector, 53275, $D01B) from 0 to 64. This is done at a particular point on every scan line. *(If you have an older Atari, POKE 623,64 to see if your machine has the GTIA chip. If so, the screen will go black.*—ANTIC ED) Every scan line will take up 32 pixels of Graphics 8, with the rest of the screen in Graphics 9. We can access these from BASIC by fooling the operating system into thinking we're in either Graphics 8 or 9 (subroutines GR8 and GR9) and then DRAWing TO the relevant section of the screen.

The source code for the display list interrupt (DLI) used is in Listing 2, GRAPHDLI.M65. You do *not* need to type in this listing in order to use the program. This source code is provided just for the information of machine language students.

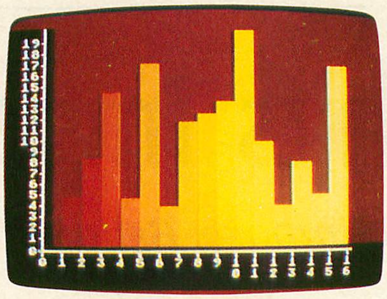
By inreasing or decreasing the DELAY between changes to PRIOR, we can change the proportions in which the screen is split between the two modes. You can create graphs such as pie charts, etc., while graphics adventures could be drawn in Graphics 9 with text or status information down the side in Graphics 8. There are many other applications requiring such labels.

What about doing the same thing with the ANTIC chip by changing a single scan line between the ANTIC E and ANTIC F display mode? According to standard reference manuals—and my own unsuccessful experiments—it's not possible because ANTIC's Display List Instruction Register (IR) cannot be accessed directly by the programmer.

PLAYDEM

The classic guidebook *De Re Atari* says that no two sections of the player can be on the same horizontal line. Therefore two incarnations (copies) of the player cannot be on the same horizontal line. This is incorrect, as Listing 3 will show. Type in Listing 3, PLAYDEM.BAS, check it with TYPO II and SAVE a copy before you RUN it.

continued on next page



By using a very precise timing loop contained within a DLI, Listing 3 allows two incarnations of Player 0 to be present in separate halves of the screen. The first incarnation occupies horizontal positions 0-122, while the second occupies positions 123-255. If either incarnation is outside this range, it won't be visible.

Source code for the actual timing loop is in Listing 4, PLAYDEM.M65. You do *not* need to type in this listing in order to use the program. This source code is provided just for the information of machine language students.



Antic proudly commences an important new "program exchange" series. During coming months, we will regularly reprint outstanding programs which originally appeared in England's leading Atari Magazine, *Page 6*. This recent exchange agreement gives Atari users on both sides of the Atlantic a much larger base of fine programming to enjoy, because *Page 6* will also be reprinting Antic's top programs for the British public.

The scan line timing waits until the first incarnation has been displayed before moving the players horizontally. This technique could be extended to all players quite easily by using NOPs (No OPeration) assembly language instructions which tell your Atari to do nothing for two machine cycles within the timing loop.

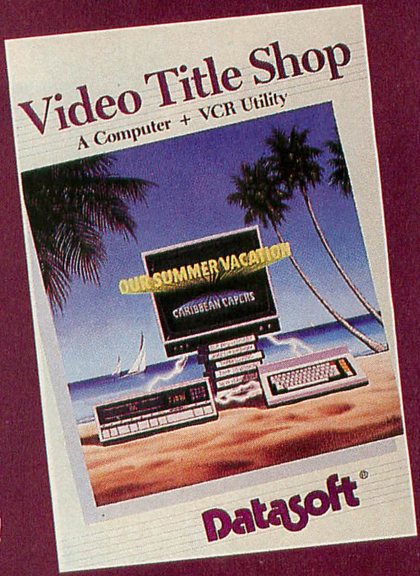
You could also change PMBASE (Player/Missile Base Address, 54279, $D407) as well, thus having completely independent incarnations of each player as long as they're within certain screen bounds.

To position these incarnations of Player 0, their horizontal positions should be stored in locations 203 and 204 respectively. The program also displays all other players and missiles to prove that there is no cheating.

This is obviously a very powerful technique, and it's feasible that in games such as Pac-Man we could generate all the ghosts from just one player. ■

Listing on page 76

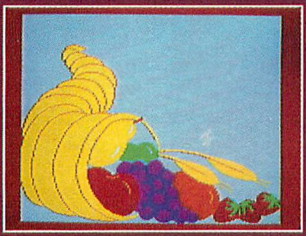
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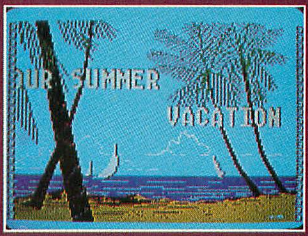
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**FLASH: You don't need to type the weekly NFL 1987-88 statistics required by Football Predictor. Log onto ANTIC ONLINE on CompuServe for instructions about how to download these figures, as well as Football Predictor's latest '87-88 success percentage.



Anthony Abuzeide

FOOTBALL PREDICTOR

Beat the Vegas spread on NFL winners

Beat the Las Vegas oddsmakers by picking the winning pro football point spreads with your Atari! Football Predictor had an impressive 59.6% season for 1986. This BASIC program works on Atari 8-bit computers with at least 32K memory and a disk drive.

IS IT REALLY POSSIBLE FOR YOUR ATARI to outguess the Las Vegas pro football oddsmakers? We think so, thanks to Football Predictor. For the National Football League's 1986 regular season, this Atari 8-bit program outguessed the official Las Vegas point spread 53 times versus 36 losses—a winning percentage of 59.6% *against the spread.*

According to scholars of gambling lore, any method that wins more than 58% is considered successful. In other words, if you managed your cash sensibly you could have made money betting with Football Predictor during the overall 1986 regular NFL season.

(Of course, the past successes of any prediction method don't guarantee future success. The authors and Antic Publishing disclaim all responsibility for whatever betting risks you may choose to take. —ANTIC ED)

Football Predictor's 59.6% success rate for 1986 is particularly impressive because it relies on a single statistical relationship and requires you to make minimal data entry for its predictions. Just enter each NFL game's net passing yardage, net rushing yardage, and points scored both for and against each team.

You can get these required statistics from the sports section of your local newspaper. Allow about 45 minutes each week for data entry.

continued on next page

BY BILL MARQUARDT AND DAVID COWLES

GETTING STARTED

Type in Listing 1, FPRED.BAS, check it with TYPO II and SAVE a copy before you RUN it. (The program is long, but none of the lines are especially hard to type.) Then join most other Americans in waiting impatiently for the first week of the pro football season.

Football Predictor covers all 28 current teams in the National Football League. But it could easily be modified to include any future expansion teams. Just change the variable T in line 110 to the new number of teams, then add the new team names to the DATA statements at the bottom of the listing.

Keep your working copy of the program on its own disk with only the DOS.SYS and DUP.SYS files for company. Leave the disk in drive 1 when you use it, because the program accesses the drive often. As the season progresses, 18 more files will be added to the disk.

MAIN MENU CHOICES

The following discussion of the main menu selections will lead you through the operations of Football Predictor.

- 1—ENTER STATISTICS

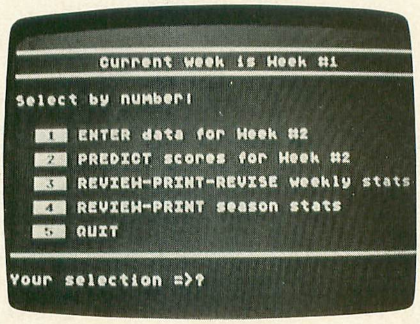
Choose this after you assemble all the required data from your sports pages. One at a time, Football Predictor will ask you for each item. After you type the last item, the program makes a data file for that week, updating both the season totals and week number files. We strongly suggest backing up your disk each week.

- 2—PREDICT SCORES

After typing at least one week's statistics, make your predictions with option 2. The screen changes, showing the game number, and displays your choices in the top half of the screen. On the bottom half are lines labeled "Home Team" and "Visitor," with an arrow prompting for the requested information.

To finish your predictions, you'll need your sports pages' schedule of the following week's games and the Las Vegas spread. Press [OPTION] until a home team appears, then press [SELECT]. Do the same for the visitor. The program will quickly predict a winner and a point spread. If you make a mistake, start over by pressing [ESCAPE]. After entering at least one matchup, pressing [START] prints your predicted scores.

To predict each game's outcome relative to the Las Vegas line, compare the program's predictions with the point spread in the newspaper. If the Predictor favors one team above the published spread by at least 4 1/2 points, select that team to *beat the spread*.



For instance, if the line favors the 49ers over the Redskins by 2 points but the Predictor favors them by 6 1/2 points, pick the 49ers to beat the spread. Likewise, if the line favors the Redskins by 2 but the Predictor favors the 49ers by 2 1/2, go with the 49ers again. This 4 1/2 point "fudge factor" was used to obtain our 59.6% success rate.

Not every game played can be predicted against the spread. Only consider betting on games having a significant edge. One week in 1986, all 14 of the Predictor's predictions were less than 4 1/2 points away from the Las Vegas line.

- 3—REVIEW WEEKLY STATS

Follow the prompts to print the statistics—either to the screen or the printer—for any or all teams during a given week. If you choose to revise incorrect statistics entered earlier, the program reads each week's data file for the season and recalculates the file showing the season totals. This tends to take a while.

- 4—REVIEW SEASON STATS

This item is similar to selection 3 except that it displays or prints totals for the season to date. Also, to revise the statistics directly, you must use selection 3 to correct any faulty data for the appropriate week(s).

- 5—QUIT

Just what it says: takes you back to the "READY" prompt.

HOW IT WORKS

Basically, the program calculates each team's average number of offensive and defensive yards per point and then divides the results by two. Our method differs from standard approaches by matching the two opposing teams directly against each other, instead of comparing each to a standard derived from the totals of all teams in the league.

No other factors are considered—not even home field advantage. So feel free to experiment: the program was written so as to be modified easily by any experienced BASIC programmer. If your modified version has a spectacularly successful 1987 season, send the modification to **Antic** to be considered for possible publication.

FOOTBALL GAMES

COMPUTER QUARTERBACK
Strategic Simulations, Inc.
1046 N. Rengstorff Avenue
Mountain View, CA 94043
(415) 964-1353
$39.95, Atari 8-bit, 48K disk

GFL CHAMPIONSHIP FOOTBALL
(Gamestar)
Activision Inc.
P.O. Box 7826
Mountain View, CA 94039
(415) 964-0410
$39.95, Atari ST ■

David Cowles and Bill Marquardt are computer professionals for the U.S. Postal Service in San Francisco. Dave originally wrote the Predictor on his IBM PC in 1984, and Bill converted it for the Atari and Apple II.

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TELEPROMPTING WITH ATARI

Our favorite 8-bit cues the President



Mary Rhomberg Peloquin

By Gregg Pearlman, Antic Assistant Editor

Whenever you see people speaking on television and looking directly at the camera for more than about 20 seconds, chances are they're using a prompter. The glass plates you see in front of the President during his speeches are actually reflecting a computer/video monitor on the floor.

Q-Tv of Los Angeles uses Atari 130XE computers as the basis of its prompter system. The company has supplied prompters for 28 years and used Ataris for four, including an occasional 800 model. Q-Tv calls its system a video prompter or computer prompter. They don't use the better-known term, teleprompter (actually TelePrompTer) because it's a registered trademark of Group W.

According to equipment supervisor and operator Jim Franz, Q-Tv's prompters are "direct-line descendants" of TelePrompTer. Q-Tv and TelePrompTer Inc. were competitors in the late 1950s. But Group W now owns the *name* "TelePrompTer" — while Q-Tv owns the patents on the equipment.

"We supply prompters for commercials, business meetings—company presidents or CEOs giving the bad news to stockholders—political speeches, industrial films, religious broadcasts, award shows—you name it," says Franz. "We've

continued on next page

done everything from sitting on top of Mount St. Helens while it was erupting, to sitting on top of the San Andreas earthquake fault."

Q-Tv does national as well as local commercials and programs. Commercials range from Ed McMahon and his sweepstakes to political messages from President Reagan. The company also supplies equipment for films and videos used by companies as in-house training films. Q-TV has also supplied Los Angeles mayor Tom Bradley and sold a system to California Governor George Deukmejian.

They work with custom software that has some word processing functions built in. But this system can also use AtariWriter files.

HOW IT WORKS

Here's the process:

1. The speech or script is sent to Q-Tv.

2. Text is input to the Atari either by typing it from the hard copy or downloading it from an IBM, via a connecting cable that converts the file to something the Atari can understand. (This transfer is similar to **Antic's** *Linkline*, which transfers files between Atari 8-bit and ST computers.)

3. The Atari saves the speech to disk. There's also an 8K buffer. This normally takes two to five minutes.

4. Q-Tv proofreads the speech,

Q-Tv has built its prompter systems around the Atari for four years

Antic Prompter

Your next speech goes scrolling by

By Heidi Brumbaugh, **Antic** Junior Editor

Not to be outdone by Q-Tv's computer prompter, ***Antic*** *brings you your own type-in prompter software for speeches or lectures given at users group meetings, classes, seminars, etc. This BASIC program works on all 8-bit Atari computers with 32K memory and a disk drive.*

If Q-Tv (see story in this issue) can use 8-bit Atari computers to run professional video prompting setups, then it stands to reason that **Antic** programmers can write type-in programs that will enable your own 8-bit—or ST—to function as a full-featured video prompting system.

Just think how great it will be to have a video prompter for all those presentations you and your friends need to make at users group meetings, classes, seminars, etc. In fact, this could be your opportunity to start a part-time video prompting business in your hometown.

START PROMPTING

If you're an 8-bit user, type in Listing 1, PROMPTER.BAS, check it with TYPO II and SAVE a copy before you RUN it. (ST users will find the 16-bit version of this program in this issue's ST Resource section.)

Antic Prompter's opening screen demonstrates the program's scrolling ability while telling you how to use the joystick to control the speed and direction of your scrolling text. Pressing any console key—such as [OPTION], [START], etc.—brings up the main menu.

If you already typed in your speech using a word processor such as AtariWriter or PaperClip—but not Letter Perfect— select [3] (Load File) from the menu. Then type the file name and select [4] (Use Teleprompter).

To create a new text file, choose option [1], Screen Editor. This barebones text editor only lets you enter a single screen of text at one time, but later we'll explain how you can merge multiple screens into a larger file.

Use [CONTROL]-[ARROW] key combinations to move around the file and [DELETE] to erase mistakes. There's no insert mode.

The last column is reserved for a right margin. Text will wrap around as you type, which may cause words at the end of a line to appear broken. But after you SAVE

the screen, the word-wrap feature will re-justify your text properly.

When you're through typing, press [ESCAPE]. The editor will fill the screen with asterisks as it reads and stores your text.

Now either select [2] from the main menu to SAVE your text to disk for future reference, or go directly to the prompter by pressing [4]. If you want to SAVE your text, do so *before* using the prompter.

If you couldn't fit the whole speech into the screen editor, SAVE the text to disk, return to the screen editor and finish typing. Then SAVE the text to the same file. When the program offers the choice of either overwriting or appending to the end of the old file, select Append. Then LOAD the entire file and press [4] to begin scrolling.

PROGRAM TAKE-APART

The program has four main sections: the screen editor, the read/write subroutines, the string parser and the scroller. All sections use Graphics 0 except the scroller, which is in Graphics 2.

Lines 500-640 present the main menu. Lines 1000-1700 contain the prompter. The joystick value is constantly checked, both while sending text to the screen and while waiting for a trigger press. Memory location 764 contains the value of the last key pressed, so it is checked often to see if the user wants to quit.

Lines 1500-1700 determine the scrolling direction and highlight the top line for easier visibility.

Lines 2000-2130 OPEN and read a file, ignoring carriage returns and control characters which would make the display look confusing.

Lines 3000-3999 SAVE text typed into the editor, first making sure the file exists and, if so, whether the user wants to append or overwrite it.

Lines 5300-5630 contain the parser, which organizes the text so that words at the end of screen lines aren't broken apart. First, it determines how many words in T$ (entered from the keyboard or file) will fit on a 20-column line. Then it puts those words into T2$ and pads the rest of the line with spaces.

The screen editor, beginning at line 7000, is limited, but it lets you enter and edit up to 936 characters. The editor OPENs the keyboard for INPUT, then GETs characters until the [ESCAPE] key is pressed. It doesn't let you insert characters, type past the bottom of the screen, or use the last column which is reserved for a margin.

When [ESCAPE] is pressed, the editor finds the last non-space character on the screen. Then it goes to the beginning of screen memory and gets the text you have typed.

Lines 10000-10999 initialize the main variables used in the program.

Error trapping for I/O problems begins at line 20000. After the problem is analyzed, a message is displayed. Control is returned to the section of the program where the error occurred. ■

Listing on page 65



making the necessary corrections and fixes. Some minor formatting problems usually crop up and last-minute text changes are commonplace—"a way of life," says Franz. But the computer can make the changes instantly.

5. Q-TV sets up the equipment for the broadcast itself.

6. "Then it's go, go."

"We firmly believe in battery-backups—having learned about them the hard way," says Franz, "and we usually have a second system nearby in case of failure." This rarely happens, but it is possible for the equipment to be banged around in its cases during transit.

"The Atari is very resilient, but it doesn't endure coffee and Coca-Cola spills," Franz says. "It's also somewhat limited in memory size, but you can still put a two-hour speech in the 800XL."

Q-Tv uses several Atari colors—if the speaker requests a color monitor. However, the words show up better in monochrome. They use 2,000-line monitors and, although the Atari can only handle 1,000 lines, the results are excellent. Q-Tv also uses modems to transfer text files, but they only use 300 baud because they have found it to be more accurate than 1200 baud.

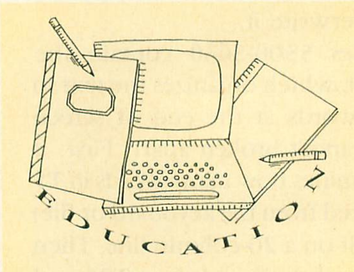
"There are several systems similar to ours," says Franz. "Computer prompting is the wave of the '80s."

Q-Tv Prompting Systems
7350 Beverly Boulevard
Los Angeles, CA 90036
(213) 936-6195
Manager: John Maffe ■

Maverick Atari School

Idaho kids program Lego robots

By Gregg Pearlman, Antic Assistant Editor



Why are adults the only ones doing research and development? Kids can do it, given the chance," says Patrick McShane, 42, headmaster of the PCS School for Advanced Learning in Nampa, Idaho.

McShane, a former schoolteacher, gives those kids the chance at PCS—a "true R&D think tank." PCS originally stood for Patrick's Computer Service—an entirely different McShane venture—and students decided to adopt the name for their school.

PCS students range in age from first grade through 12th. Three years ago a nine-year-old student said "I want to run my Lego motorized stuff from the computer." That's how CAMLU (Computer Activated Motorized Lego Unit) got started as a course of study.

"I started teaching out of my home in 1984," says McShane. "Eventually, people whose kids couldn't get what they wanted from computers at school came to me. I had a reputation of knowing a *little* about computers, so I started taking on students, and then it grew and grew and grew. Last summer I taught 15 students out of my home, and I decided, 'Whoa—it's time to expand to a public building.' "

Word of PCS gets around without help from advertising. "I've never had to advertise," McShane says. "I just keep adding students. I even had a student from France. We have 70 now, and several enroll just for the summer. No one's dropped out—well, one student had to move to Montana. Only 10 of the students are girls, but I try to recruit more."

There used to be an age minimum of nine, but a couple of people who really wanted to enroll their children "didn't exactly tell the truth" about their children's ages. One boy turned out to be six. "He can handle even the 1040ST as well as the other kids," says McShane, "so I dropped the age restriction."

CLASSES OF THREE

Each student has a time slot, but there's no actual class structure. "We start with a three-month 'introduction' series of classes," says McShane, "and then students pretty much choose their own direction. They start writing programs for controls, which is very involved, and they have to understand a little machine language."

Students attend PCS once a week for 90 minutes. There are never more than three at a time in class. "They're mostly average, mainstream kids," says McShane. "Sure, some are gifted, but others have learning disabilities. The difference between these kids and the kid down the street is the drive and desire to excel and explore.

"I used to balk at taking on kids with learning disabilities—dyslexia, autism and mild retardation, but now there are some in our program and they're doing very well. In fact, our CAMLU graphic was done by an autistic boy who drew it in 15 minutes with NEOchrome. Little is known about autism except that it's difficult to deal with and that communication is limited, but the computer has unlocked things for this boy. He has a better self-image and he's doing better in school."

The school owns about $3,000 worth of

Lego pieces. Besides the supply for PCS students, McShane also needs some when he takes CAMLU to other schools once or twice a week. "Last fall we got a grant from the Whittenberger Foundation in Idaho, which has let us bring demonstrations of our teaching concept to the classrooms," says McShane.

Lego has provided sets that aren't publicly available—for example, PCS has a plotter made of Legos. The students have modified the original design "because it didn't work quite right," and now it's connected to an Atari.

"Lego was developed originally to teach mechanical engineering principles at the high school and university levels," McShane says. "They're true miniatures of things that work in the real world. I'm not trying to create little mechanical engineers, just to open up an understanding of it." John Crowley, director of the Technic division of Lego Systems, Inc., visited PCS in August, 1987.

"We have a hoist that travels on a rope and lifts 41 pounds—with a 4-volt motor—all made from Legos," says McShane. "The Lego people couldn't believe it. They thought it couldn't lift more than two pounds. It took 46 students three months and it all started when someone asked, 'What should I build today?' I said, 'Build something that climbs a chain.' It's an extremely complicated, very fine piece of machinery."

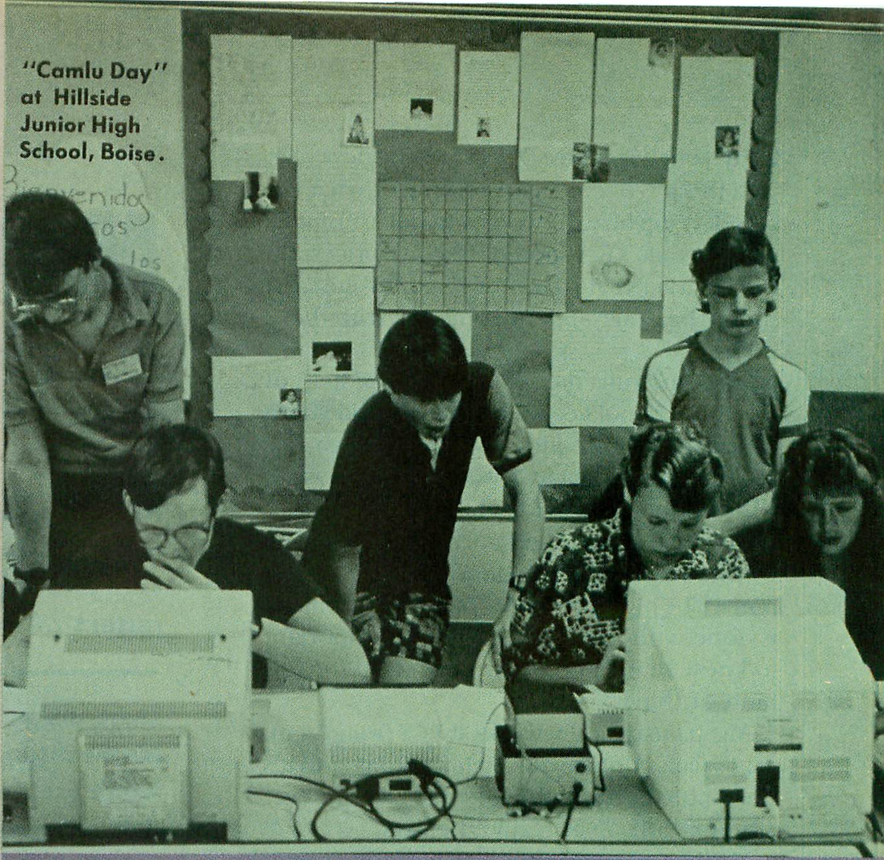
LOW TUITION

McShane charges $25 per month per student. Some families have more than one student, but the most he charges any family is $40 a month. "Maybe I'm selling myself short," he says, "but I'd rather see this technology available to anyone, not just upper-class families who can afford more. We're making money *now*—a year ago I'd have said no. All extra money goes back into the school for whatever we need."

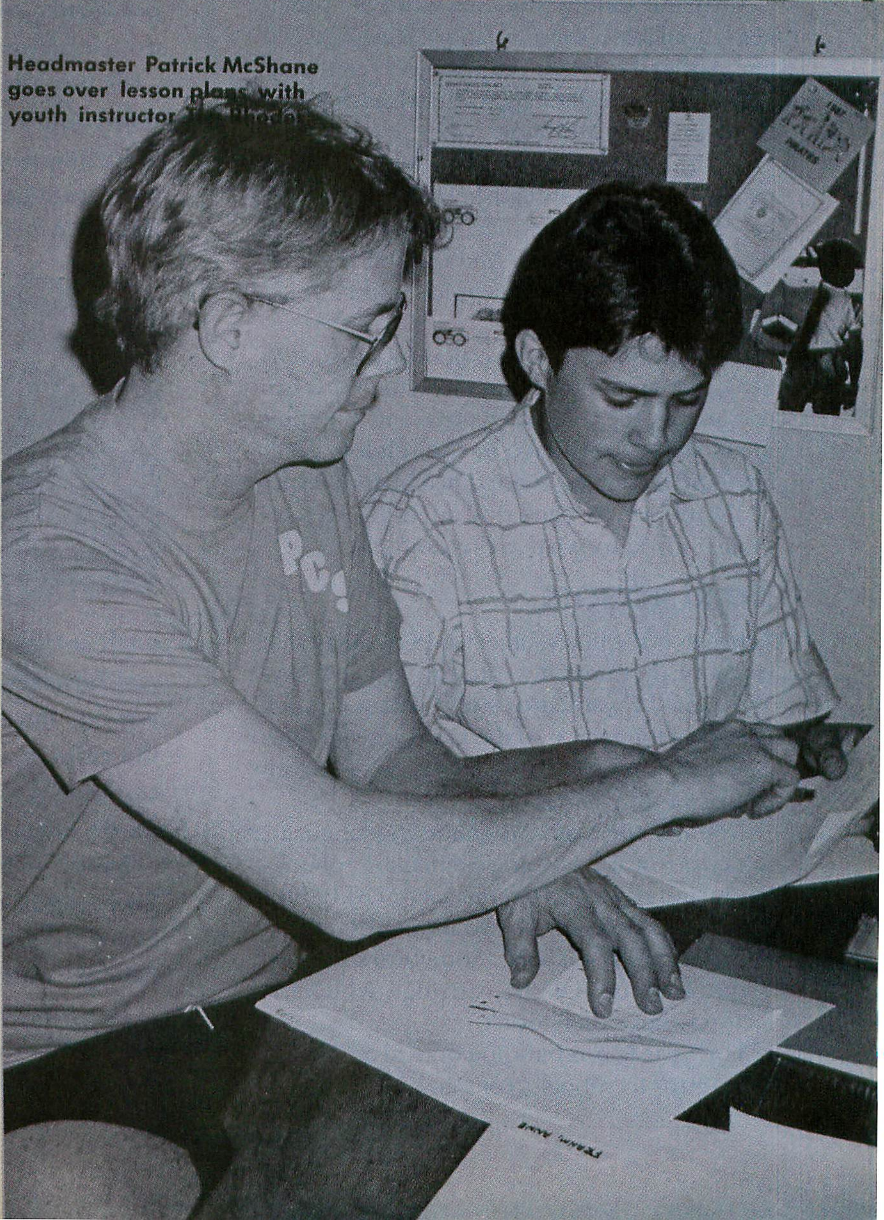
Since the sole source of income is student fees, McShane isn't in a position to pay anyone. "So if something happened to me today," he says, "the technology would go right down the tubes. Only about 40% of what happens here has been documented."

PCS students come from 50 miles around. "I'll be expanding PCS to Boise, the state capital," says McShane, "which would be a good move financially. But I have an ethical obligation to my original students here, that's why I want to stay in Nampa. I'm doing this expansion jointly with Dr. Trudy Comba, head of Small World Center, which takes children up to first grade—naturally leading to PCS after-

continued on next page



"Camlu Day" at Hillside Junior High School, Boise.



Headmaster Patrick McShane goes over lesson plans with youth instructor [illegible]

ward. I envision three PCS centers by next year.

"I think we could market some of what the kids develop here. However, I'm not a businessman. People say I should raise my prices, do this, market that—I'm not a money-raiser. It should be done—but by someone with those skills."

McShane runs the school with the help of a volunteer bookkeeper and 14-year-old youth instructor Tim Rhodes. "We don't teach, we guide," says McShane. "We help the kids set a direction. We provide enough information to get started, and their creativity takes over.

"Our bookkeeping is done on an 8-bit computer. The big database for our Lego inventory is done with SynFile+. I think it's important to know that you don't need an IBM for this kind of thing."

McShane typically works at PCS from 7 a.m. till 11 p.m., Monday through Saturday, and it's even more hectic in the summer. Does he ever get time off? "Not really," he says.

McShane and the students write their own texts. Available resource material wasn't geared high enough for their purposes. "Even the little kids were insulted by stuff written for junior high," says McShane.

All the kids learn word processing, database management and spreadsheets. McShane believes that those three pieces of software will be crucial in their lives. And they all work on CAMLU News, the PCS newsletter, on a rotating basis.

"The technology we've developed *should* be available to kids," says McShane. "It's important for them to be creative and use their imaginations. Let's face it, the schools don't have the resources, trained teachers or, especially, money. We can't find anything even remotely close to what we're doing here."

ATARI ROBOTS

Robotics is the main subject at PCS. "I say that if you can think it, you can do it," says McShane. "I wanted to show that a joystick isn't only for games, so the kids came up with a space shuttle where the robot arm is controlled by the joystick.

"We use the Logo programming language, which is fine for teaching elementary robotics command controls. There's also Atari BASIC, but it's too slow, so we use BASIC XE, Turbo BASIC XL and ACTION!. Sometimes we pop in the Microsoft II BASIC cartridge, which has features that others don't."

This year PCS is building optical and touch sensors for its robots. "Let's face it," McShane

BONUS GAME

Math Flashcards

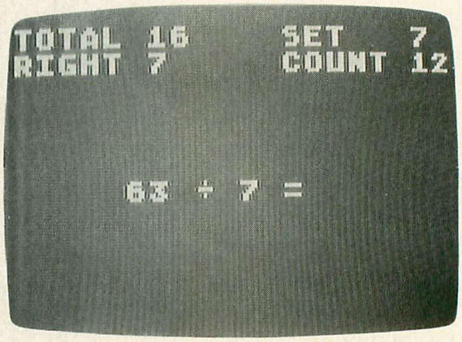
Arithmetic drill that kids really use

By Andy Barton

Math Flashcards is a direct, no-nonsense arithmetic flashcard program that kids enjoy using. This BASIC program works on all 8-bit Atari computers of any memory size, with disk or cassette.

There are many elementary-school arithmetic programs for the Atari. I have four or five myself, but my children won't use them. The kids have outgrown the count-the-dots programs, they're frightened off by the competitive programs, or they play with the flashing colors and dancing creatures and don't learn the math.

Arithmetic Flashcards is a simple, straightforward, non-competitive math program designed to help children learn the primary arithmetic tables for addition, subtraction, multiplication and division. It's interesting, but not flashy. A little randomized music routine rewards each correct answer, a slightly longer routine plays after each set is successfully completed, and a long routine sounds after nine sets are finished.



The emphasis is on repetition. In each set the child must get 15 consecutive problems correct before advancing. If the child gets an answer wrong, the screen turns red, the count is reset to 15 and the child must come up with the correct answer before continuing. The missed problem is repeated three times on an orange screen alternated with new problems.

Speed is important. If there is no answer given within 20 seconds a buzzer sounds and the error routine begins. Every 20 seconds the buzzer gets longer until a "Get Going" message prods the child on.

The program is aimed at learning, not at making mistakes. The number of correct answers and the total number tried are displayed. But the number of errors is not

directly monitored. I did make one concession to my kids. The program allows them to skip easy sets by choosing the set they wish to start with.

GETTING STARTED

Type in Listing 1, FLASH.BAS, check it with TYPO II and SAVE a copy before you RUN it.

If you have trouble typing in the special characters in line 10070, don't type them in. Listing 2 will create them for you. Type Listing 2, checking it with TYPO II, and SAVE a copy to disk or cassette. When RUN, Listing 2 will ask you whether you are using a disk drive or a cassette. Next, the program creates these hard-to-type lines, and stores them in an disk file called D:LINES.LST (for disk owners) or to a fresh cassette tape.

To merge the two programs, LOAD Listing 1, "D:FLASH.BAS" then ENTER "D:LINES.LST". (Cassette owners should CLOAD Listing 1, then insert the tape file created by Listing 2 and type ENTER "C:").

Finally, remember to SAVE the completed program before you RUN it.

CUSTOMIZING

To accommodate your individual needs and style, several variables were used to make it easy for the inexperenced programmer to customize Math Flashcards. Change the value of the following variables as you wish and RUN the program. When you are satisfied with your changes SAVE it back to disk.

In line 10240, COUNT determines the number of consecutive correct answers needed to go on to the next set. SET determines the number table that the program will start at. The option of choosing the starting set can be eliminated by deleting lines 10200 through 10220 and giving SET a value from one to nine.

In line 10250, TLIM sets the time limit for typing the answer. A value of one is extremely quick, about four seconds, and a value of five allows about 20 seconds. REPEAT sets the number of times a missed problem is repeated.

Line 10260—CTUNE, STUNE, and ETUNE are the number of notes played after a correct answer, after each set and after set nine. BUZZ is the length of time the buzzer sounds for a wrong answer. BUZZ is converted to PAUSE which is increased in line 70 to determine if, in line 80, the "Speed Up" message is printed. ■

Andy Barton of San Carlos, California is the author of TYPO II, which has appeared in every issue of Antic since January, 1985.

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says, "a robot without sensors isn't a robot at all."

PCS has an old 800—"which I *won't* get rid of" — a modified 800XL, three 130XE systems and a 1040ST—"we drool over a hard drive for it." There's also a CompuServe account for the kids to do research. We've had no equipment turnover whatsoever. We had our ST since December, 1986, and if we lost it, we'd be in trouble—everybody uses it."

But how do these Atari computers control the robots?

"We use joystick port 1 on the 8-bit computers to access the Peripheral Interface Adapter (PIA) chip and we configured memory location 54016 as output," says McShane. "Once we found the right combination of bits for using that address, the students split it into two nibbles. The low nibble is used for output and we can still access the other nibble for input devices. (*See* Stepper Motor Robot Controller *in **Antic**, December 1986, pages 62-65.*—ANTIC ED) So the kids' Logo programs can use not only the keyboard to control robotics, but also the joystick in port 2. The programs can also send information to the interface in port 1 and a Covox Voice Master."

The students developed the technology, with help from a Hewlett Packard technican who teaches electronics twice a month. "**Antic** Magazine is our resource material," says McShane. "Lots of good support. If the place caught fire, **Antic** would be the first thing out the door."

CUSTOM COVOX

"When the kids wanted to use voice control, I bought a Voice Master from Kevin Gevatosky at Covox" McShane recalls. "Location 54016 was locked up—and that's the address we absolutely must have. Kevin never dreamed we'd use his product this way, but he rewrote the code for us. We probably have the only Covox version that permits output on port 1 to control our vehicles. The implication here is that the controls can be used for anything. So quadriplegics using Voice Master, as long as there's nothing wrong with their speech patterns, should be able to control anything.

"The interface we've built for our motor control unit (MCU) costs only about $5 in parts—I'd really like to make that available. We've written tons of programs for the controls, and so many people have Lego sets at home. There's a wide market for it."

PCS has had its MCUs for two years. They've

continued on next page

BONUS GAME

Name the Presidents

"Woodrow who. . ?

By Peter Loeser

This simple, short program helps youngsters learn the Presidents of the U.S. It works on 8-bit Atari computers of any memory size, disk or cassette.

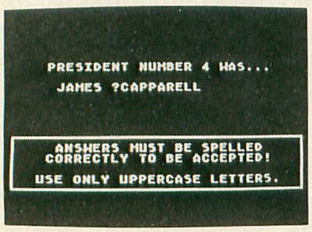
Name the Presidents requires you to identify all 40 American presidents in the order they were elected. It gives you both the number and first name of each president and then asks for the last name.

If you guess correctly, you keep going. If you're wrong or don't know the answer, you can either continue guessing or type HELP for the correct answer. When you've named all the presidents, the number of your guesses is displayed.

START NAMING

To play Name the Presidents, type in Listing 1, PRESQUIZ.BAS, check it with TYPO II and SAVE a copy before you RUN it. The answers have been encoded, to discourage students from peeking.

To change the number of presidents after the 1988 election, change the value of the variable TL in line 115. Next, encode the entry by substituting each letter of the president's last name with the next higher letter of the alphabet (FORD, for example, would become GPSE). Finally, add a new data line after 920 and remember to include the final line: DATA 0,END,END.



As a high school social science teacher and president of The Educator's Atari Club (TEAC) in Laytonville, CA, I have produced and rewritten educational programs for our users group's library for several years. I wrote this program for Antic as a thanks for all the educational programs they've published in the past. Our group now has a library of over 25 classroom-tested educational disks, and because Atari educational software is so hard to come by, we do all we can to find or produce new public domain programs. ■

Peter Loeser invites teachers to find out more about what The Educator's Atari Club is up to. Contact TEAC at P.O. Box 1024, Laytonville, CA 95454.

Listing on page 67

been banged around and subjected to cold, heat and rain. "They haven't failed," says McShane. "You can't hurt them—they never need any repairs."

While McShane hasn't needed to advertise, he and PCS have had local television and press coverage. "The media people ask the wrong questions, though, and are *very* patronizing," he says. "But we've considered approaching public television at Boise State University about a series on micro-robotics.

"But when you say Nampa, Idaho, people don't know where it is, and they figure that nothing exciting develops here. And they think Lego's a toy—they're unaware of its educational value."

The students have been in contact with some of the movers and shakers in the Atari community—as well as the computer field as a whole. PCS students have written to retired Rear Admiral Grace M. Hopper, the inventor of COBOL, Steven Witzel, president of Multibotics, Inc. in Woodcross, Utah, and Tom Hudson. "The kids must understand that they *can* approach the movers and shakers," says McShane. "Just because they're important in their field doesn't mean they're unapproachable. The very worst that could happen is not getting a reply."

McShane impresses upon his students that their main responsibility is to their families and themselves, then their schoolwork and finally PCS or other extracurricular activities. "If students get a D or F in *any* school subject, they are suspended from PCS," says McShane. "Those grades are important. State law demands a C average to graduate. But with one or two exceptions, the kids are all A or B students.

"Most of them participate in sports. That's important. If you're not physically fit and sit in front of a CRT all day long, you'll become a computer nerd."

McShane says that adults often are intimidated by PCS—it's over their heads, etc. "I say they don't need to understand it—just to *appreciate* the creativity. I mean, some of it's over *my* head. But if they really didn't like what we did, they'd pull their kids out of class."

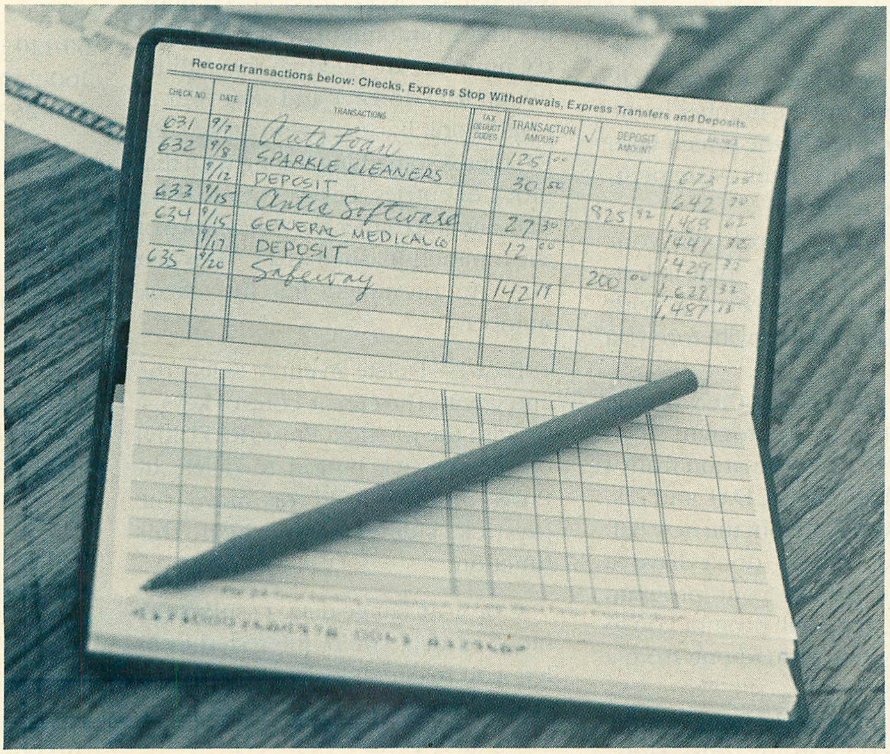
The three simple school rules are "be respectful, be realistic and be reliable." "It's important to keep things in proper focus," says McShane. "For example, it's unrealistic to try building something out of Legos that could fly—Legos aren't aerodynamic. However, I'll give $1,000 to any student who can do it—short of throwing the Legos against a wall."■

Checkbook Balancer

End bounced checks the easy way

By Rod Saylor

This compact but powerful listing produces a user-friendly calculating database that will keep your checking accounts current. Check Balancer is a BASIC program that works on all 8-bit Atari computers with at least 24K memory and a disk drive.



When I bought an Atari 130XE computer my wife wanted to know, "Can you balance the checkbook with that thing." I replied, "Well, you can, but. . ." And she said, "Just as I thought—another toy."

I couldn't let her get away with that, so I looked through countless magazines and books until I found a type-in checkbook program. It was huge and took me about six hours of typing.

I proudly announced, "Here it is, honey." But as I demonstrated it for her, we found that the program required a degree in accounting to understand. So I gave up and bought a commercial home-finance program that kept track of everything, from what day I bought a pack of gum to

continued on next page

how much money I spent on batteries last year. Yes, this impressive program would do it all—if I remembered to type in a stack of receipts and notes every day, and didn't mind swapping disks four or five times per session.

There had to be a better way. This straightforward, no-frills Checkbook Balancer program was born of a frustrated desire to make my wife believe in my Atari computer.

USING CHECKBOOK BALANCER

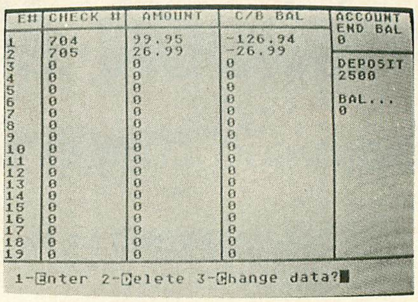
Just enter your deposits, checks and electronic teller transactions as they occur, comparing your records with what you type into the computer. When you get a bank statement, delete the checks that have come back. Enter any interest as a deposit, enter any service charge as a *negative* deposit such as −3.45. Then select choice 6 to compute your new balance, and compare the number in the upper right corner of the screen with the total in your bank statement. That's all there is to it.

Start regaining control over your checking accounts today. Type in Listing 1, BALANCE.BAS, check it with TYPO II and SAVE a copy before you RUN it.

Press any key to make the working screen appear. The program then loads your check information from a disk file called CHECK.DAT and displays the first check from the new balance period. If you don't have a CHECK.DAT file on your program disk, the program will prompt you to create a new one or load one from a different disk.

You can enter checks or electronic teller transactions in any order. However, it's easier to delete returned checks if they're in numerical order.

The menu commands can be either numbers or letters. This gives you the option of using the Atari CX85 numeric keypad. Just load the CX85's handler program before using Checkbook Balancer and you're ready to go. Whenever Checkbook Balancer prompts you to verify a command, you can press either [+] or [Y] on your computer. (The computer's [+]



key corresponds to the [YES] key on the CX85.)

MAIN MENU

Press [RETURN] to switch between the two menu lines at the bottom of the screen.

E or 1—Entry Number. Type the next unused entry number from the E# column. Then follow the prompts. You will be asked for a check number and an amount of money. If all entry numbers are filled up through E# 99, go back to E# 1 and start over. If Checkbook Balancer won't take your E#, there's something wrong with that block of entries. For electronic teller transanctions, enter the *day.month* of the transaction (such as 23.05) when you are prompted for the check number.

D or 2—Delete an entry. Select the entry with the cursor control keys—or with the joystick. Press [RETURN] or the joystick button to delete it. Press the [ESCAPE] or move the joystick sideways to abort this function.

C or 3—Change data. Displays the block of data you're interested in or lets you make deposits. Type the E# (entry number) of the record you want to display, or type [0] to enter a deposit.

SECONDARY MENU

As stated above, press [RETURN] to switch between the two menu lines at the bottom of the screen.

S or 4—Save data. Follow the prompts to save your data to the CHECK.DAT file.

R or 5—Retrieve data. This option loads a CHECK.DAT file and displays the first check from the new balance period. If you don't have a CHECK.DAT file on your disk, the program will prompt you to create a new one or load one from another disk.

S or 6—New balance. This option recalculates your account's end balance.

P or 7—Prints a list of outstanding checks.

Q—Quit. This choice does not appear on the menu. Type [Q] to end the program. Be sure to save your data before leaving the program.

PROGRAM TAKE-APART

10-40	Startup screen.
50	Sets up strings, makes the cursor and inverse video invisible.
60-120	Sets up working screen.
160-240	Main selection menu.
250-255	CLS subroutine—clears message window, repositions cursor for next message and disables the [BREAK] key.
260-350	Secondary menu.
360-410	Entry subroutine.
450	FIG subroutine, math for balance.
460-520	Delete check subroutine.
530-540	Deposit routine.
550-590	PRT subroutine, clears screen and prints new data.
600-680	Disk storage routine.
690-780	Disk retrieval routine.
790-810	Math for account end balance.
820-890	Routine to print outstanding checks.
910-960	Subroutine for joystick deletion.
1000-1100	Disk error handler.
1110-1200	Creates a blank CHECK. DAT file. ■

Rod Saylor is stationed in Europe with the U.S. armed forces. He is a member of the Eifel Atari Users Group, which is named for the mountains on the France-Germany-Luxemburg border, not the tower.

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THE ST RESOURCE

ANTIC OCTOBER 1987



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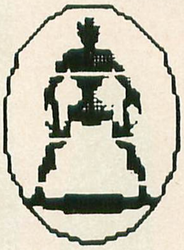
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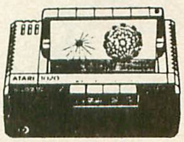
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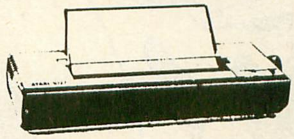
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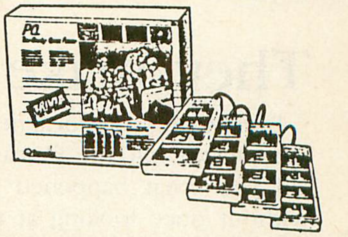


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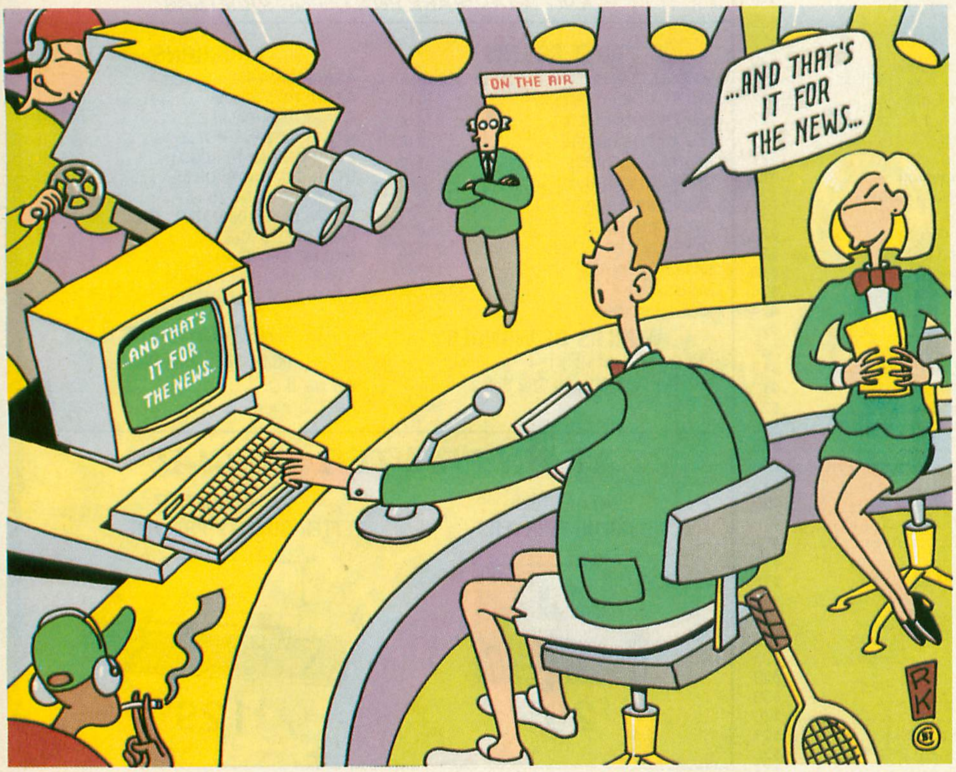
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Antic Prompter ST

By Patrick Bass, ST Resource Technical Editor

Giving Yourself That Cronkite Confidence



Robert Kopecky

They make it look so easy.

Every night, your local newscasters stare deeply into the TV camera and tell you what happened that day, without once looking at the notes they hold. How do they do it? Do they memorize all their stories before the show? Of course not. The text of what they have to say is displayed in big letters on a screen next to the TV camera, and the newscaster reads his or her story right off this screen.

The device that performs this work is called a prompter. Elsewhere in this issue of Antic you'll find Gregg Pearlman's article detailing the Video Prompter produced by Q-TV Prompting Systems, and Heidi Brumbaugh's program and article showing how to get a video prompting program running on the Atari 8-bit computers.

This month The ST Resource presents Antic Prompter ST, the ST version of Heidi's 8-bit Antic Prompter. It's written in GFA BASIC, runs on any color or monochrome Atari ST system, and will smoothly scroll ST text files (using very large letters) up the TV screen at speeds ranging from very slow to faster than most people can talk.

USING ANTIC PROMPTER ST

There are two ways to get a copy of Antic Prompter ST up and running in your Atari ST. First, you may type in *Listing 1*, STPROMPT.BAS, using GFA BASIC. Second, those of you who get the Antic Disk edition may copy the program STPROMPT.PRG from side B of the 5.25 inch Antic Monthly disk to your own 3.5 inch ST disk using LinkLine. The instructions for using LinkLine to copy files are contained inside the HELP file on side B.

If you choose GFA BASIC to enter *Listing 1*, type the program in carefully and save a copy to disk before you run it. While we don't have a TYPO program for GFA BASIC yet, GFA BASIC will check the syntax on each line you type in automatically. However, be careful with variable names and constant values, as these cannot be checked for accuracy by GFA BASIC.

PROMPTING A FILE

When you run Antic Prompter ST, the screen will clear and then present a typical File Selector box for you to select the text file to show. Either type in or click on a filename to select it. If the file is present on the disk, the

AtariPrompter ST will scroll a text file using large letters across your television screen.

screen will clear again, and the file text will begin to scroll slowly up the screen in large letters.

You may control the speed of the scroll with the numeric keys on the ST keyboard. The keys 0 through 9 control how slowly or quickly the text scrolls up, with [0] being the fastest and [9] being the slowest. When your file has finished scrolling past, a small alert box will pop up and ask if you wish to display another file. If you don't, click on the exit button. While Antic Prompter ST is displaying a file, you may stop it by holding down either mouse button for about a second.

PROGRAM BREAKDOWN

Examine *Listing 1*. This is the source code to Antic Prompter ST written with GFA BASIC. Let's go over the code here section by section and discover what it does.

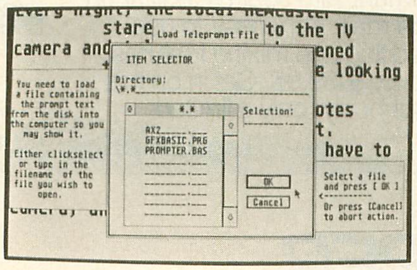
Initialize

This part of the source code gives us a place to assign initial values to variables and create space to save program information. Notice that this section is where the program will make decisions depending on what resolution you power up in. For example, if you power up in low resolution, the program will ask you to switch to medium resolution and then drop back to the Desktop.

Keep in mind the resolution differences between medium and high. Both are 640 dots wide, but the high-res screen has twice as many dots vertically (400) as opposed to 200 for medium-res. There is a system call to



return the current screen resolution, called **XBIOS(4)**. This call returns a zero for low-res, a one for medium resolution and a two for high-res. To write this program so it can operate in medium- or high-res, I first assume medium-res and then multiply any reference to the vertical scale by multiplying it by the number returned by the **XBIOS(4)** call.



Open_text_file

This procedure will present the File Selector box for you to enter the filename of the file you wish to show on Antic Prompter ST. It also presents a few boxes of helpful information on the use of the File Selector, allows you to choose the file and then exits.

Read_the_file

Now we get to the main section of the code. If the file you ask for really does exist, the program will clear the screen, open the disk file you asked for, and determine the length of the disk file. Next, it will write the name of the file you asked for onto the screen as a reminder to you of which file was actually opened.

Now we fall into the main REPEAT loop. First, check to see if a keystroke has been pressed. If one has, check to see if it was a numeric key between one and nine. If it was indeed a numeric key, use the value of the key (times ten) as the delay value between lines displayed onscreen.

Otherwise erase the string we'll use for the next line to be displayed. Next, actually go to the disk and get the next line of characters (up to the next carriage return) and place it into **Raw_input_line$**. Then actually place the line onscreen with the **Format_new_line** call, and subtract the length of this line from the total size of the text file the program is currently displaying. Continue the REPEAT loop until we have displayed the entire file.

Scroll_the_screen_up

To actually smooth-scroll the ST screen, we use the Block Move command in GFA BASIC to grab screen memory running from one line from the top of the screen down to the bottom, and move it one line up. Everything else on the screen moves along with it, producing the scroll up.

PRACTICALLY PRACTICAL

Y'know, I just remembered that last month I wrote another practical program for the Atari ST ("Pursuit Of The Graf STrivial"). If I don't watch out, people may start thinking an Atari computer is good for more than just games, eh? ■

Listing on page 77

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BALANCE OF POWER
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Reviewed by Harvey Bernstein

The sweat broke out on my forehead as I anxiously awaited the Soviet response. Having increased military aid to the Indonesian government to four billion dollars in order to prevent a Communist takeover, I've withstood several challenges to my action from the U.S.S.R. Now, however, I've gone to DefCon 3 and placed our forces on a world-wide alert. If the Russians don't back down now, there is an excellent chance nuclear war will follow, surely meaning an end to the game (not to mention the world!). Fortunately, they "blink," and take their protest to the United Nations. I guess they didn't want to go to war over Indonesia any more than I, but my increase in prestige worldwide gives me a good lead in the game.

The above scenario is but a mere shadow of what playing **Balance of Power** is like. If there was ever a game designed for the new generation of 16-bit home computers, this is the one. No, there is no animation or fancy graphics. In fact, author Chris Crawford has gone out of his way to avoid a magnificent animated end-of-the-world display. Balance of Power, however, is one of the finest examples of artificial intelligence implemented in a computer game to date, and the most challenging and nerve-racking keyboard encounter I've had, *including* all my years as a text-adventure player.

The game is not easy to summarize in a short review, but I'll try. You take the role of President of the United States (or Premier of the U.S.S.R.) for an eight-year span. As leader of your country, it is your responsibility to gain greater worldwide prestige and acclaim than your adversary. By using the resources at your command, including military and economic aid, troop placements, diplomatic pressure, and even the CIA (or KGB), you do everything in your power to support friendly governments, topple unfriendly ones, and perhaps persuade those on the fence to see things your way. Of course, your opponent will be doing the same.

The real challenge of the game comes in two areas. First of all, your realization that every action determines how the rest of the world looks at you, whether or not that action directly affects them. For instance, you may have a conventional defense treaty with an ally, such as Indonesia in the example above. By allowing that government to fall, every *single one of your allies* will reconsider their relationship with you and start looking much more favorably upon your opponent, resulting in a considerable loss of prestige (and appropriate gain by the other side).

The most challenging aspect of Balance of Power, however, and the real arena in which the game is won and lost is that of crisis management. Either side can challenge an action of the other on the battlefield of international diplomacy. If the challenged party feels strongly enough about what he is doing, he can reject the challenge. The action can be re-challenged, refused again, each level raising the stakes (prestige value) higher. Starting with a backchannel discussion (considered to be a quiet chat behind closed doors), and commencing through a diplomatic crises, and several levels of military crises, a challenge can result in the winning or losing of the game, depending on who loses his nerve. The twist is that the more often you head recklessly into a military crises, the more likely it is that the next one will end in an accidental nuclear war, bringing the game to an end and causing both sides to lose.

Thus, you cannot do whatever you want (sending 20,000 troops into Cuba, for instance) without invoking the wrath of your opponent. You must make every move with the consideration of whether or not you will

continued on next page

be challenged, and how far you are willing to go. Conversely, you need to carefully scrutinize your opponent's moves, determining which parts of the world he feels stongly enough to go to the mat over, and in which he is simply flexing his muscle. The one game I completed and won required keeping copious notes on how my opponent reacted to my most important actions.

One of the greatest aspects of computer games is that they allow you to live dangerous or thrilling adventures vicariously. As I mentioned earlier, the graphics in Balance of Power are nothing to write home about, but if you want to lead the life of a Machiavellian power-hungry megalomaniac, then this is the game for you.

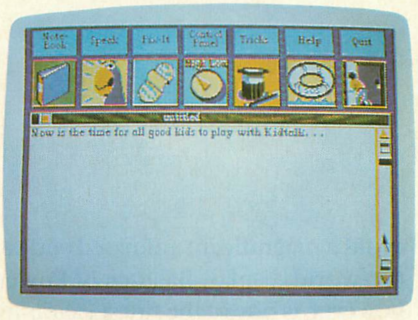
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MATH TALK
SPELLER BEE

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$49.95 each

Reviewed by Sol Guber

First Byte has brought out a set of educational programs for the Atari ST— **First Shapes**, **Kid Talk**, **Math Talk** and **Speller Bee**. Each of the programs can talk to you using a built-in software speech synthesizer. The speaking aspect is used to help teach young children about shapes, math and spelling. The programs are effective teaching tools, but some of them utilize the speech synthesizer more effectively than others.

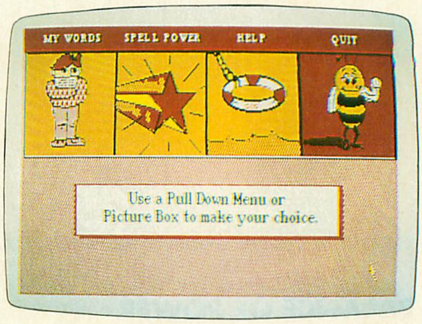
There is a great deal of similarity in these four programs. When the programs start, they all say the name of the program and the company, First Byte. They also all use a specific character to do the talking. First Shapes has Ted E. Bear, Kid Talk has a parrot, Speller Bee has the Bee, and First Math uses Professor Matt A. Matics. You can understand all of the characters, but the most intelligible is Ted E. Bear, since he says the fewest number of



different words. The speech synthesizer helps make the learning experience more enjoyable and probably increases the time a child will spend at these games. The games also allow you to customize them for an individual child. You can add complements and praise as well as a child's name into a file, which you can then add to future games.

All of the programs are structured in a similar manner. They use only medium resolution, which limits your colors to four, but this is not particularly offensive. The programs use menus with their on-screen pictures, activated by the mouse controls for choosing the various options in each program. The mouse control makes the programs easier for young children to use. Also, each program has many sections to it, so that they will hold a child's interest longer. The sections are divided into parts for learning and parts where you play games, and the education aspects are not so obvious.

My nine-year-old daughter's favorite game is First Shapes, even though this is for younger children. It "Introduces Young Children to Geometric Shapes" and teaches you about ovals, circles, squares, triangles, and big and little. There are many sections to this program. In the first, Ted E. Bear shows you the shape and says the word. Once you can recognize the shapes, you get to play three little games with Ted. You can play any of the games by picking them from the menu, which also has pictures for



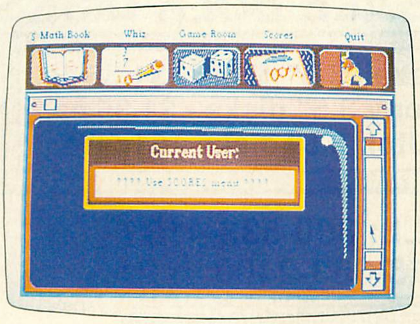
each of the games.

Math Talk is my daughter's second favorite program. As it states, it's "a powerful learning tool for mathematics mastery" and gives you drills in addition, subtraction, multiplication and division. This program is for older children. It is very effective and nonjudgmental when you make a mistake. If you make a mistake more than once, the professor will come and remind you how to do the problem. It also allows children to do their own problems by setting up a math book, then quizzes them until they can solve them correctly.

Besides the simple drills, there are also two games in this program, Table Talk and Mystery Number. Table Talk lets children fill out the math tables by giving them many problems. It asks the child to guess out how long it will take him or her to finish the 100 problems. If the child thinks that the 100 problems are too many, he or she can quit in the middle and the program will issue a score. Since this is a timed test, it helps a child calculate faster. Mystery Number shows an equation with one of the numbers missing. The child has to determine the number. You can make the game easy or difficult. This is another method of learning the various arith-

metic operations.

Kid Talk is a word processor program that says the letters, words or sentences as you type them in. This is a real word processor for children since it has many of the commands that a full-blown word processor has.



It allows for printing, deleting, and for movement of blocks of words as well as loading and saving data. It is very easy to learn all the operations. The program is somewhat slow (you can out-type it), but for a child who is not a touch-typist, this will not be noticeable.

Speller Bee is the last, and unfortunately, least-effective program. As the title suggests, it teaches you how to spell. It is often difficult to really understand the words in this one. To help you, the word list it uses is first shown on the screen and then it pronounces the words. Speller Bee comes with word lists of various difficulties, and you can also put your own spelling words into the game for drills.

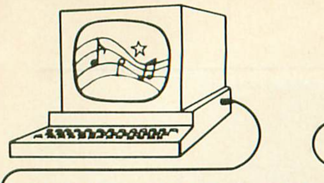
There are three additional games with this program to help teach spelling. The first game is a "scramble" one—a word is shown on the screen, letters rearranged, and you have to guess it and type the correct spelling. The program will give you clues, like showing the word list or saying the word. There is also a detective game where the word is shown with letters missing and you have to guess it. There is also a word search game that puts the spelling words in the square. This is the best way for learning spelling, since you just look at the words so long that you have to learn them!

There are many good points to all of these programs. There are tours in the program for both parents and children, and the mouse controls make the programs easy to use. All

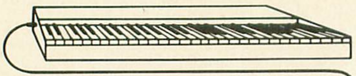


you have to do is push a button on the screen with the mouse to perform actions. First Shapes is extremely effective for young children. It contains many cute touches and allows the most customization of the programs. You can also save information on the disk so the program will remember information about each child. Each program comes with a 15-25 page manual that explains the programs well, and gives more information about the customizing features. There is also a section on the educational considerations of each program.

All of these programs are easy to recommend both for using the ST effectively, and the educational considerations. The spelling bee program is the poorest due to the fact that slight mispronunciations cause a word to be difficult to discern, but the other three programs are effective and fun for children to use. Unfortunately the programs are strongly copy-protected, making them difficult to run off a hard disk. ■

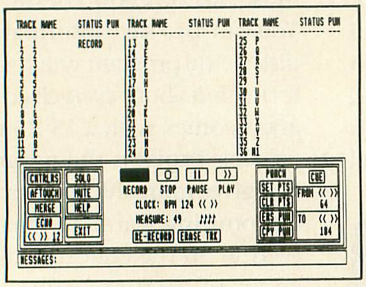


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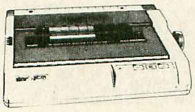
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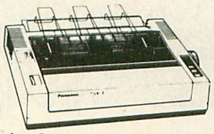
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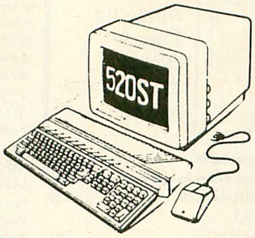
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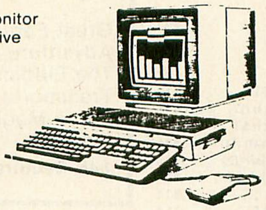
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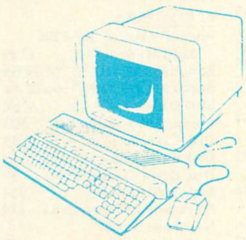
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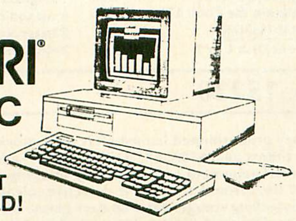
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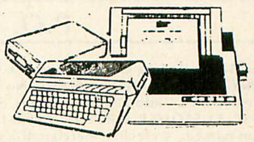
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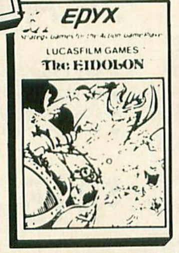
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DISK SUBSCRIBERS: Programs for 8-bit Atari computers can be used immediately. Just follow instructions in the accompanying magazine articles. ST Owners: See monthly disk's ST Help File for instructions on how to transfer programs to 3-1/2 inch disk.

DOS COMPATIBILITY: All 8-bit programs published by **Antic** are tested to work with Atari Disk Operating System (DOS) 2.0S and 2.5—*not* with the incompatible DOS 3.0. DOS 2.0S is available on each Antic Monthly Disk. Copy the DOS.SYS and DUP.SYS files.

TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
0123456789 0123456789

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below.

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	CTRL ,		CTRL S
	CTRL A		CTRL T
	CTRL B		CTRL U
	CTRL C		CTRL V
	CTRL D		CTRL W
	CTRL E		CTRL X
	CTRL F		CTRL Y
	CTRL G		CTRL Z
	CTRL H		ESC ESC
	CTRL I		ESC CTRL –
	CTRL J		ESC CTRL =
	CTRL K		ESC CTRL +
	CTRL L		ESC CTRL *
	CTRL M		CTRL .
	CTRL N		CTRL ;
	CTRL O		SHIFT =
	CTRL P		ESC SHIFT CLEAR
	CTRL Q		ESC DELETE
	CTRL R		ESC TAB

INVERSE VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	[Atari logo] CTRL ,		CTRL X
	[Atari logo] CTRL A		CTRL Y
	[Atari logo] CTRL B		CTRL Z
	[Atari logo] CTRL C		ESC SHIFT DELETE
	[Atari logo] CTRL D		ESC SHIFT INSERT
	[Atari logo] CTRL E		ESC CTRL TAB
	[Atari logo] CTRL F		ESC SHIFT TAB
	[Atari logo] CTRL G		[Atari logo] CTRL .
	[Atari logo] CTRL H		[Atari logo] CTRL ;
	[Atari logo] CTRL I		[Atari logo] SHIFT =
	[Atari logo] CTRL J		ESC CTRL 2
	[Atari logo] CTRL K		ESC CTRL DELETE
	[Atari logo] CTRL L		ESC CTRL INSERT
	[Atari logo] CTRL M		
	[Atari logo] CTRL N		
	[Atari logo] CTRL O		
	[Atari logo] CTRL P		
	[Atari logo] CTRL Q		
	[Atari logo] CTRL R		
	[Atari logo] CTRL S		
	[Atari logo] CTRL T		
	[Atari logo] CTRL U		
	[Atari logo] CTRL V		
	[Atari logo] CTRL W		

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key. Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key instead.)

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be boxed. Compare the two sets of characters below:

SPECIAL		STANDARD	
	CTRL F	/	/
	CTRL G	\	SHIFT +
	CTRL N	_	SHIFT –
	CTRL R	-	–
	CTRL S	+	+

HOW TO USE TYPO II (8-BIT)

TYPO II automatically proofreads **Antic**'s type-in BASIC listings for 8-bit Atari computers. It finds the exact line where you made a program typing mistake.

Type in TYPO II and SAVE a copy to disk or cassette. Now type GOTO 32000. When you see the instruction on the screen, type in a single program line **without the two-letter TYPO II code** at the left of the line number. Press the [RETURN] key.

Your line will reappear at the bottom of the screen with a two-letter TYPO II code on the left. If this code is not exactly the same as the line code printed in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME"[RETURN](Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "↖":POSITION 11,1:? "TYPO II "

EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "↖":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
```

your next speech goes scrolling by

ANTIC PROMPTER

Article on page 39

LISTING 1

Don't type the TYPO II Codes!

```
UC 10 REM ANTIC PROMPTER
DU 20 REM BY HEIDI BRUMBAUGH
BS 30 REM (c) 1987, ANTIC PUBLISHING INC.

GQ 40 REM (DO NOT RENUMBER THIS PROGRAM!)

HS 50 GRAPHICS 0:SCR=PEEK(88)+256*PEEK(89
   )
FD 100 GRAPHICS 2:POKE 712,148:POKE 708,2
   02
FT 110 POSITION 6,4:? #6;"ANTIC":? #6;"
       PROMPTER":POKE 752,1
FF 120 ? "By Heidi Brumbaugh↓←←←←←←←←←←←←←
   ←←←←←←▶▶▶▶▶▶▶▶▶▶▶▶▶↓"
WZ 130 GOSUB 10000:GOSUB 12000
MS 510 ? "▣Main menu:"
YJ 520 ? "          1 - Screen editor"
YQ 530 ? "          2 - Save text to disk"
CR 540 ? "          3 - Load file from disk"
IC 550 ? "          4 - Prompt speech"
LE 560 ? "          5 - Exit"
PM 600 TRAP 640:? :? "Option";:INPUT OPT
VK 610 ON OPT GOSUB 7000,3000,2000,700,32
   767:GOTO 510
GS 640 ? :? "Please enter a number betwee
   n 1 and 5.":GOTO 600
IW 700 TRAP 40000
JN 705 IF LEN(T$)>0 THEN ? "■";:POSITION
   10,5:POKE 752,1:? "One moment...":GOSU
   B 5300
IN 710 IF LEN(T2$)>0 THEN GOSUB 1000:RETU
   RN
LA 720 ? "■Please enter text (or the name
    of an":? "ASCII file) before using pr
   ompter."
VB 730 SEC=1:GOSUB 14000:RETURN
OQ 999 REM MAIN SCROLL ROUTINE STARTS HER
   E
ZT 1000 TRAP 40000:REM DISABLE TRAP
KG 1020 B=1:P=50:M=0:JOY=15:POKE 764,255
YA 1025 GRAPHICS 18:POKE 708,84:POKE 710,
   122:POKE 709,84:POKE 711,122
GF 1030 GOSUB 1510:REM DRAW FIRST SCREEN
IH 1040 IF PEEK(644)=0 THEN M=0:X=2^2:GOT
   O 1200
AL 1060 IF JOY=14 THEN M=20:GOSUB 1500
RL 1070 IF JOY=13 THEN M=-20:GOSUB 1500
OZ 1080 IF JOY=7 THEN P=P+10:GOSUB 1500
CM 1090 IF JOY<>11 THEN GOSUB 1500:GOTO 1
   100
OF 1092 P=P-10:IF P<0 THEN P=0
AN 1094 GOSUB 1500
XD 1100 IF M=0 THEN 1200
OT 1110 GOTO 1040
BT 1200 REM STOPPED
OG 1205 IF PEEK(764)<>255 THEN 1300:REM G
   ET OUT
```

continued on next page

```
WN 1210 JOY=PEEK(632):IF JOY=15 THEN 1205

PY 1220 GOTO 1060
XF 1300 POKE 764,255:FOR J=1 TO 100:NEXT
   J:RETURN :REM EXIT TELEPROMPTER HERE
PO 1499 REM SCROLL UNTIL JOYSTICK OR TRIG
   GER PRESSED
VT 1500 IF M=0 OR (E>=LEN(T2$)-19 AND M=2
   0) OR (B=1 AND M=-20) THEN M=0:GOTO 16
   40
FC 1510 B=B+M:E=B+119:JOY=15
DY 1520 FOR I=1 TO 20
AP 1530 X$(I,I)=CHR$(ASC(T2$(B+I-1,B+I-1)
   )+128)
FL 1540 NEXT I
YP 1550 IF M=20 THEN 1570
QU 1560 S=1:B2=B+39:E2=E:R=2:POSITION 0,0
   :? #6;X$(1,20):FOR J=1 TO P:NEXT J:GOT
   O 1580
YW 1570 S=-1:B2=E:E2=B+20:R=10
GQ 1580 FOR I=B2 TO E2 STEP 20*S
AT 1590 POSITION 0,R:? #6;T2$(I-19,I)
TM 1610 FOR J=1 TO P:NEXT J:R=R+(2*S)
IQ 1617 IF JOY=15 THEN JOY=PEEK(632)
EM 1618 IF PEEK(644)=0 THEN M=0
FH 1620 NEXT I
VE 1630 POSITION 0,0:? #6;X$(1,20)
DQ 1640 IF PEEK(764)<>255 THEN M=0:JOY=15
   :GOTO 1700
IA 1650 IF JOY=15 THEN JOY=PEEK(632)
DV 1660 IF PEEK(644)=0 THEN M=0
UG 1670 IF JOY=15 AND M<>0 THEN 1500
AN 1700 RETURN
OX 2000 TRAP 40000:? "■What is the filena
   me";:INPUT X$
QX 2010 TRAP 2100:CLOSE #1:OPEN #1,4,0,X$
   :I=1
IR 2020 ? "■";:POSITION 10,5:? "Reading f
   ile...";
WE 2030 GET #1,A:IF A=155 THEN A=32:GOTO
   2035
YL 2032 IF A<32 OR (A>=123 AND A<=159) TH
   EN 2030:REM IGNORE CONTROL CHARS
YT 2035 T$(I)=CHR$(A):I=I+1:GOTO 2030
VC 2040 ? "completed."
FJ 2045 SEC=1:GOSUB 14000:T2$=""
AP 2050 RETURN
RD 2100 ERR=PEEK(195):ERL=PEEK(187)*256+P
   EEK(186):CLOSE #1
UC 2110 IF ERR=136 THEN 2040:REM EOF
RS 2115 IF ERR=5 AND ERL=2035 THEN ? :? :
   ? "File too long...truncating.":GOTO 2
   045
ST 2120 IF ERR=170 THEN ? :? "Error-- fil
   e not found.":SEC=1:GOSUB 14000:RETURN

WC 2130 IOERR=2050:FNERR=2000:GOTO 20030
OB 3000 TRAP 40000:REM OUTPUT TEXT TO DIS
   K FILE
ER 3003 IF LEN(T$)>0 THEN 3010
OX 3005 ? "■Error-- you haven't entered t
   ext, or":? "have already used prompter
   ."
NJ 3007 SEC=1:GOSUB 14000:RETURN
YZ 3010 TRAP 3500:REM SEE IF FILE EXISTS
OS 3020 ? "■File name";:INPUT X$
TT 3030 OPEN #1,4,0,X$
MX 3040 CLOSE #1
MG 3050 ? "■File already exists.":?
CZ 3060 ? "      1 - Overwrite file"
YG 3070 ? "      2 - Append text to file"
NT 3080 ? "      3 - Cancel"
RG 3090 ? :? "What would you like to do";
   :TRAP 3110:INPUT OPT
GS 3100 ON OPT GOTO 3200,3300,3400
YK 3110 ? :? "Please enter 1, 2 or 3.":GO
   TO 3090:REM INVALID RESPONSE
JE 3200 MODE=8:GOTO 3600
JR 3300 MODE=9:GOTO 3600
BH 3400 GOTO 3999
KV 3500 IF PEEK(195)=170 THEN CLOSE #1:MO
   DE=8:GOTO 3600:REM CREATE NEW FILE
GF 3510 IOERR=3999:FNERR=3010:GOTO 20000
YD 3600 REM WRITE TEXT TO FILE
RR 3610 IOERR=3999:FNERR=3010:TRAP 20000:
   OPEN #1,MODE,0,X$
VE 3620 ? #1;T$
NG 3630 CLOSE #1
DE 3999 RETURN
CJ 5299 REM PARSE STRING
HP 5300 TRAP 5600:B=1
LZ 5320 E=21
AX 5330 IF T$(E,E)=" " THEN 5340
TV 5332 IF E>1 THEN E=E-1:GOTO 5330:REM F
   IND END OF 20 COLUMN LINE
MW 5335 E=21
TF 5340 T2$(B,B+E-2)=T$(1,E-1):B=B+E-1:RE
   M PUT LINE INTO NEW TEXT STRING
EY 5350 N=21-E:IF N>0 THEN T2$(B,B+N)=BL$
   (1,N):B=B+N:REM FILL TO END OF LINE
XS 5360 IF T$(E,E)=" " THEN E=E+1:GOTO 53
   60:REM BEGINNING OF NEW LINE
IZ 5370 T$=T$(E,LEN(T$)):GOTO 5320:REM UP
   DATE OLD TEXT
SA 5400 T2$(B,B+LEN(T$))=T$
TU 5410 T2$(LEN(T2$)+1,LEN(T2$)+20-LEN(T$
   ))=BL$(1,21-LEN(T$))
YW 5500 FOR I=1 TO 4:T2$(LEN(T2$)+1)=BL$:
   NEXT I
NI 5510 T2$(LEN(T2$)+1)="        *END*
     ":T$=""
CY 5599 RETURN
KK 5600 TRAP 40000:ERL=PEEK(187)*256+PEEK
   (186):ERR=PEEK(195)
KJ 5610 IF ERL=5330 AND (ERR=9 OR ERR=5)
   THEN 5400
NY 5620 IF ERL=5360 AND (ERR=9 OR ERR=5)
   THEN 5500
WQ 5630 ? "ERROR ";ERR;" AT LINE ";ERL;"
   .":END
YZ 7000 REM SCREEN EDITOR
AR 7010 TRAP 40000:OPEN #1,4,0,"K:":POKE
   82,0:? "■";
NB 7020 R=0:C=0
NQ 7030 GET #1,X
EQ 7040 IF X=255 OR X=157 THEN 7030:REM D
   ISABLE INSERT MODE
OQ 7050 IF X=27 THEN 7500:REM EXIT WITH E
   SC
OI 7060 IF X=155 AND R=23 THEN ? "↓";:REM
    THROW OFF CR AT END OF SCREEN
HJ 7070 IF X=30 AND C=0 THEN ? CHR$(X);
NW 7080 ? CHR$(X);:R=PEEK(84):C=PEEK(85)+
   256*PEEK(86):REM PRINT CHARACTER AND A
   DJUST POSITION
DQ 7090 IF R=23 AND C>38 THEN POSITION 38
   ,R:C=38:? CHR$(253);:REM CAN'T TYPE PA
   ST END OF SCREEN
XO 7100 IF C=39 THEN C=0:R=R+1:? CHR$(155
   );:REM LEAVE ONE SPACE AS RIGHT MARGIN
RA 7110 GOTO 7030
XO 7500 REM ESCAPE PRESSED; READ SCREEN V
   ALUE
XQ 7510 CLOSE #1:POKE 752,1:? "↓";
FI 7530 I=SCR+LSCR
HP 7540 IF PEEK(I)=0 THEN POKE I,10:I=I-1
   :GOTO 7540
CJ 7550 L=I-SCR+1:C=1
OK 7560 FOR I=1 TO L
EI 7565 IF INT(I/40)=I/40 THEN 7640
UY 7570 X=PEEK(I+SCR-1)
JZ 7580 IF X<=63 THEN X=X+32:GOTO 7630
SY 7590 IF X<=95 THEN X=X-64:GOTO 7630
DQ 7600 IF X<=127 THEN 7630
KP 7610 IF X<=191 THEN X=X+32:GOTO 7630
PM 7620 IF X<=223 THEN X=X-64:GOTO 7630
JS 7630 IF X=155 THEN X=32
EF 7635 T$(C,C)=CHR$(X):POKE I+SCR-1,10:C
   =C+1
FT 7640 NEXT I
JT 7650 POKE 752,0:T2$=""
AT 7700 RETURN
HL 10000 REM CALC. SCREEN
DW 10010 LSCR=(24*40)-1
DE 10100 L=2000:DIM T$(L),T2$(L+500),X$(2
   55),BL$(20)
PY 10110 BL$=" ":BL$(20)=BL$:BL$(2)=BL$
HB 10999 RETURN
LK 12000 GOSUB 13000
CH 12020 GOSUB 5300:REM PARSE STRING
KS 12030 T2$(LEN(T2$)-99)=BL$
KO 12040 T2$(LEN(T2$)+1)="     (C) 1987
   "
YN 12050 T2$(LEN(T2$)+1)="         BY
   "
RW 12060 T2$(LEN(T2$)+1)=" ANTIC PUBLISHI
   NG    "
YX 12070 T2$(LEN(T2$)+1)=BL$
OR 12080 T2$(LEN(T2$)+1)="  PRESS ANY KEY
   "
EL 12090 T2$(LEN(T2$)+1)="   TO CONTINUE
   "
NG 12100 GRAPHICS 18:POKE 708,84:POKE 710
   ,122
DR 12110 P=50:M=0:B=1:JOY=15:TRAP 40000:P
   OKE 764,255:GOSUB 1510
QV 12120 M=20:GOSUB 1040
FW 12130 T2$="":RETURN
EV 13000 T$(1,85)="ANTIC CORDIALLY WELCOM
   ES YOU TO THE ANTIC PROMPTER! THIS JOY
   STICK-DRIVEN TELEPROMPTER"
JK 13010 T$(86,170)=" IS EASY TO USE; SIM
   PLY TYPE IN YOUR TEXT (OR THE NAME OF
   AN ASCII FILE ON DISK) AND "
ZP 13020 T$(171,255)="YOU'RE READY TO GO!
    PUSH THE JOYSTICK UP TO MOVE FORWARD;
    IF YOU WANT TO GO BACKWARD "
CA 13030 T$(256,340)="SIMPLY PULL THE JOY
   STICK BACK. PRESSING THE TRIGGER TEMPO
```

```
   RARILY STOPS MOVEMENT. TO SC"
CE 13040 T$(341,425)="ROLL FASTER MOVE TH
   E JOYSTICK LEFT; MOVE IT RIGHT TO SLOW
    THINGS DOWN. TO RETURN TO T"
XY 13050 T$(426,466)="HE MAIN MENU JUST P
   RESS ANY CONSOLE KEY. "
EB 13060 RETURN
WO 14000 REM PAUSE
VY 14010 POKE 19,0:POKE 20,0
YR 14020 IF PEEK(19)<SEC THEN 14020
DI 14100 RETURN
ZM 20000 TRAP 40000:REM DISABLE TRAP
PV 20010 CLOSE #1:REM CLOSE CHANNEL
TF 20020 ERR=PEEK(195):ERL=PEEK(187)*256+
   PEEK(186)
SF 20030 IF (ERR>=138 AND ERR<=140) OR ER
   R=142 OR ERR=164 THEN 20200
EA 20040 IF ERR=162 OR ERR=169 OR ERR=144
    THEN 20300
XZ 20050 IF ERR=130 OR ERR=160 OR ERR=165
    THEN 20400
AC 20060 ? "Error--";ERR;" at line ";ERL;
   "."
PT 20070 END :REM UNPREDICTED ERROR
BK 20200 ? :? "I/O error # ";ERR;" has oc
   curred"
QZ 20210 ? "while trying to access disk."
BX 20220 ? "Check the disk and"
NF 20230 ? "try again.":?
RG 20240 SEC=3:GOSUB 14000:GOTO IOERR
BN 20300 ? :? "I/O error # ";ERR;" has oc
   curred"
TC 20310 ? "while trying to write file."
VP 20320 ? "The disk or directory is full
   , or"
VT 20330 ? "the disk is write protected."
XH 20340 ? "Please replace disk and try a
   gain.":?
RN 20350 SEC=3:GOSUB 14000:GOTO IOERR
KH 20400 ? :? "Illegal file name."
BT 20410 ? "Filenames must be in the form
   :":?
ZU 20420 ? "      D:FILENAME.EXT":?
AD 20430 ? "Where D: is the device name,
   filename"
AX 20440 ? "is the name, which must begin
    with"
WT 20450 ? "a capital letter and contain
   only"
ZA 20460 ? "letters and numbers, and .ext
    is the"
RQ 20470 ? "extension."
YD 20480 ? :? "Please try again.":?
NP 20490 SEC=3:GOSUB 14000:GOTO FNERR
```

"woodrow who. . ?"

NAME THE PRESIDENTS

Article on page 46

LISTING 1

Don't type the TYPO II Codes!

```
OW 2 REM NAME THE PRESIDENTS!
MM 4 REM REM BY PETER LOESER
QH 6 REM (c)1987, ANTIC PUBLISHING
CI 15 GRAPHICS 2+16:POKE 712,34:POSITION
   0,1
KJ 20 ? #6;"NAME THE PRESIDENTS!"
MU 30 SOUND 0,50,10,2:GOSUB 1150
UR 35 POSITION 0,3:? #6;"name the preside
   nts!"
VY 40 SOUND 0,100,10,5:GOSUB 1150
WL 50 POSITION 0,5:? #6;"name the preside
   nts!"
QT 55 SOUND 1,150,10,8:SOUND 0,0,0,0:GOSU
   B 1150
WE 65 POSITION 0,7:? #6;"NAME THE PRESIDE
   NTS!"
BW 67 SOUND 2,200,10,11:SOUND 1,0,0,0:GOS
   UB 1150
XY 80 POSITION 0,9:? #6;"NAME THE PRESIDE
   NTS!"
HV 82 SOUND 3,250,10,14:SOUND 2,0,0,0:GOS
   UB 1150
NR 85 SOUND 3,0,0,0
OZ 90 ? "▣":POKE 752,1:POKE 710,34:POKE 7
   12,34:POSITION 5,2:? "Let's see if you
    know the names"
VR 95 ? "of our Presidents in their corre
   ct"
SY 100 ? "order.   I'll give you their fi
   rst     names, you give their last..."
YS 110 DIM P$(20):DIM F$(20)
GV 115 DIM A$(20):TL=40:G=0
FR 120 READ NUMBER,F$,P$:FLAG=1
KO 130 POSITION 7,9:? "PRESIDENT NUMBER "
   ;NUMBER;" WAS..."
JS 140 GOSUB 1100:POKE 16,112:POKE 53774,
   112:POKE 702,64
OY 160 IF P$="DMC" THEN 1000
VD 170 POSITION 8,11:POKE 752,1:? F$;" ";
   :INPUT A$
SG 180 IF A$="HELP" THEN 390
YZ 190 IF A$<>P$ THEN 320
RT 200 GRAPHICS 2+16:POKE 712,34:G=G+1
PK 210 POSITION 3,2:? #6;"* * * * * * *"
PW 230 POSITION 3,4:? #6;"*  YOU ARE   *"
CC 250 POSITION 3,6:? #6;"*  CORRECT   *"
TO 270 POSITION 3,8:? #6;"* * * * * * *"
UG 280 GOSUB 440
JY 290 POKE 752,1
MG 310 GOTO 120
IO 320 ? "▣":POSITION 8,8:? "SORRY, THAT'
   S WRONG ...":G=G+1
HW 330 ? :? :? " If you can't get it you
   may type"
HN 335 ? :? "            HELP, but first..."
PG 340 FOR X=1 TO 750:NEXT X
RK 350 ? "▣"
KM 360 POSITION 8,9:? "TRY PRESIDENT ";NU
   MBER;" AGAIN"
RK 370 GOSUB 1100
OX 380 GOTO 170
VR 390 ? "▣":POSITION 4,10:? "THE ANSWER
   WAS ";F$;" ";P$:G=G+1
TK 400 GOSUB 1150
YF 410 ? "▣":GOTO 290
NS 430 GOTO 150
MS 440 FOR I=1 TO 3
DC 450 FOR X=1 TO 75
DF 460 SOUND 0,X,10,8
MC 470 NEXT X
WE 480 SOUND 0,0,0,0
NC 490 FOR DELAY=1 TO 50:NEXT DELAY
FV 500 NEXT I
WC 510 PRINT "▣":POKE 710,34:POKE 712,34
ZF 520 RETURN
ZN 530 DATA 1,GEORGE,XBTIJOHUPO
PQ 540 DATA 2,JOHN,BEBNT
QM 550 DATA 3,THOMAS,KFGGFSTPO
OR 560 DATA 4,JAMES,NBEJTPO
HE 570 DATA 5,JAMES,NPOSPF
HI 580 DATA 6,JOHN QUINCY,BEBNT
MC 590 DATA 7,ANDREW,KBDLTPO
NU 600 DATA 8,MARTIN,WBO!CVSFO
HY 610 DATA 9,WILLIAM H.,IBSSJTPO
QC 620 DATA 10,JOHN,UZMFS
WQ 630 DATA 11,JAMES K.,QPML
SW 640 DATA 12,ZACHARY,UBZMPS
UC 650 DATA 13,MILLARD,GJMMNPSF
FY 660 DATA 14,FRANKLIN,QJFSDF
ZI 670 DATA 15,JAMES,CVDIBOBO
DP 680 DATA 16,ABRAHAM,MJODPMO
OG 690 DATA 17,ANDREW,KPIOTPO
YU 700 DATA 18,ULYSSES S.,HSBOU
KE 710 DATA 19,RUTHERFORD B.,IBZFT
QO 720 DATA 20,JAMES A.,HBSGJFME
IA 730 DATA 21,CHESTER A.,BSUIVS
QY 740 DATA 22,GROVER,DMFWFMBOE
HA 750 DATA 23,BENJAMIN,IBSSJTPO
RY 760 DATA 24,GROVER,DMFWFMBOE
DM 770 DATA 25,WILLIAM,NDLJOMFZ
TG 780 DATA 26,THEODORE,SPPTFWFMU
JU 790 DATA 27,WILLIAM H.,UBGU
NU 800 DATA 28,WOODROW,XJMTPO
```

continued on next page

```
OD 810 DATA 29,WARREN G.,IBSEJOH
BS 820 DATA 30,CALVIN,DPPMJEHF
EN 830 DATA 31,HERBERT C.,IPPWFS
TT 840 DATA 32,FRANKLIN D.,SPPTFWFMU
AL 850 DATA 33,HARRY S.,USVNBO
WM 860 DATA 34,DWIGHT D.,FJTFOIPXFS
YC 870 DATA 35,JOHN F.,LFOOFEZ
VI 880 DATA 36,LYNDON B.,KPIOTPO
AC 890 DATA 37,RICHARD M.,OJYPO
GU 900 DATA 38,GERALD R.,GPSE
NJ 910 DATA 39,JAMES E.,DBSUFS
BE 920 DATA 40,RONALD,SFBHBO
SV 930 DATA 0,END,END
CA 1000 ? "K":POKE 710,34:POKE 712,34:POK
   E 752,1
FP 1005 POSITION 2,7:? "
   "
VK 1010 ? "
   "
DT 1015 POSITION 2,9:? " YOU TOOK  ";G
DR 1020 POSITION 18,9:? " TRIES TO IDENTI
   FY "
QF 1025 POSITION 2,10:? "            ";TL
BV 1030 POSITION 18,10:? " PRESIDENTS!
   "
BB 1035 ? "
   "
SB 1040 ? "
   "
WO 1050 POSITION 0,16:? "PUSH OPTION TO Q
   UIT NAME THE PRESIDENTS"
BC 1055 POSITION 0,18:? "PUSH START TO RE
   RUN NAME THE PRESIDENTS":? :?
DQ 1060 IF PEEK(53279)=3 THEN GRAPHICS 0:
   END
UX 1065 IF PEEK(53279)=6 THEN RUN
QJ 1070 GOTO 1060
WF 1100 POSITION 3,16:? "
                        ANSWERS MUS
   T BE SPELLED      "
NZ 1110 ? "     CORRECTLY TO BE ACCEPTED!
   "
JS 1120 ? "    USE ONLY UPPERCASE LETTERS
   .   "
WW 1130 ? "
   "
VK 1140 IF FLAG=1 THEN FOR X=1 TO LEN(P$)
   :P$(X,X)=CHR$(ASC(P$(X,X))-1):NEXT X:F
   LAG=0
BH 1145 RETURN
QR 1150 FOR X=1 TO 200:NEXT X:RETURN
```

end bounced checks the easy way

CHECKBOOK BALANCER

Article on page 47

LISTING 1

Don't type the TYPO II Codes!

```
NU 2 REM CHECKBOOK BALANCER
WP 4 REM BY ROD SAYLOR
QH 6 REM (c)1987, ANTIC PUBLISHING
MG 10 TRAP 50:OPEN #3,4,0,"K:"
TR 20 GRAPHICS 1:POKE 710,0:? #6:? #6:? #
   6:? #6;" Rod's CHECKBOOK or":? #6:? #6
   ;" checking made easy"
HW 30 POKE 709,37:POKE 755,4:FOR N=1 TO 1
   500:NEXT N:POKE 755,0
PU 40 ? " Written by Rod Saylor 1987 Germ
   any":? :? "    Press any key to contin
   ue":GET #3,Q:Q=0
JU 50 GRAPHICS 0:POKE 709,3:POKE 710,7:DI
   M C(100),A(100),CB(100),Q$(3):POKE 755
   ,0
FD 60 TRAP 160:REM TRAP TO MENU,SETUP SCR
   EEN
MH 70 POSITION 0,0:? " E# CHECK # AMOUNT
    C/B BAL  ACCOUNT";
BA 80 POSITION 0,1:? "
   END BAL";
IG 90 FOR L=2 TO 20
LU 100 POSITION 0,L:? "         
        ";:NEXT L
XK 110 POSITION 31,3:? "         ";:POSIT
   ION 32,4:? "DEPOSIT";
QI 120 POSITION 0,21:? "
   ";:GOTO 690
TN 130 GOSUB 250:? "  display block(1-99)
   ,deposit(0)";:INPUT E:IF E=0 THEN 530
OH 140 IF E>99 THEN 130
UW 150 GOSUB 550
LI 160 POKE 755,2:TRAP 160:GOSUB 250:? "
   1-Enter 2-Delete 3-Change data";:INPUT
   Q$
NQ 170 IF Q$="1" OR Q$="E" THEN 360
OO 190 IF Q$="2" OR Q$="D" THEN 460
GO 210 IF Q$="3" OR Q$="C" THEN 130
SA 230 IF Q$="Q" THEN GOSUB 1210
ON 240 GOTO 260
EM 250 POSITION 0,22:? "
   2                         ";:POSITION 0,2
UF 255 POKE 16,112:POKE 53774,112:RETURN
TS 260 GOSUB 250
TO 270 ? " 4-Save 5-Retrieve 6-New 7-Prin
   t data";:INPUT Q$
LJ 280 IF Q$="S" OR Q$="4" THEN 600
VX 300 IF Q$="R" OR Q$="5" THEN 690
WF 320 IF Q$="N" OR Q$="6" THEN 790
SB 330 IF Q$="Q" THEN GOSUB 1210
WA 340 IF Q$="P" OR Q$="7" THEN GOSUB 820
OG 350 GOTO 160
HE 360 GOSUB 250:? " enter data  E#";:INP
   UT E:IF E>99 THEN 360
FG 365 IF E<>INT(E) THEN 360
WI 370 IF C(E)<>0 THEN 360
TE 380 GOSUB 250:? "      check #";:INPUT
   Z:C(E)=Z:Z=0
TG 390 GOSUB 250:? "     amount $";:INPUT
   Z:A(E)=Z:Z=0
GQ 400 GOSUB 250:? "E#";E;" check #";C(E)
   ;" for ";A(E);"$,SURE+";:INPUT Q$
OJ 410 IF  NOT (Q$="+" OR Q$="Y") THEN C(
   E)=0:A(E)=0:GOTO 360
UI 420 GOSUB 450
UV 430 GOSUB 550
OF 440 GOTO 160
VC 450 D=D-A(E):CB(E)=D:RETURN :REM FIG
ZJ 460 GOSUB 250:? "***DELETE CHECK* E#";
   :GOSUB 900
NB 470 GOSUB 250:? "*DELETE CHECK #";C(E)
   ;" $";A(E);" SURE-FIRE";:STR=STRIG(0)
JK 480 IF STRIG(0)=0 OR PEEK(764)=12 THEN
   510
SU 490 IF STICK(0)<>15 OR PEEK(764)=28 TH
   EN E=E-X+2:GOTO 160
PY 500 GOTO 480
HH 510 A(E)=0:C(E)=0:CB(E)=0
IV 520 GOSUB 550:GOTO 460
PF 530 GOSUB 250:? "  amount of deposit "
   ;:INPUT Z:D=D+Z:POSITION 32,5:? "
   ";:POSITION 32,5:? Z:Z=0
BV 540 POSITION 32,7:? "BAL...";:POSITION
   32,8:? "       ";:POSITION 32,8:? D:G
   OTO 790
US 550 FOR L=2 TO 20:REM PRT
EX 560 POSITION 0,L:? "   ";:POSITION 4,L
   :? "       ";:POSITION 12,L:? "
   ";:POSITION 21,L:? "         ":NEXT L
LA 570 FOR L=2 TO 20:IF E+L>101 THEN 590
TP 580 POSITION 0,L:? (L-2)+E:POSITION 4,
   L:? C((L-2)+E):POSITION 12,L:? A((L-2)
   +E):POSITION 21,L:? CB((L-2)+E)
OH 590 NEXT L:RETURN
RF 600 GOSUB 250:? "SAVE DATA, Y/N";:INPU
   T Q$:IF Q$<>"Y" THEN 160
CC 610 GOSUB 250:? "      TOO LATE NOW,
   SAVING DATA      ";:TRAP 1000:POKE 77
   ,128
FX 620 CLOSE #1:OPEN #1,8,0,"D1:CHECK.DAT
   "
DB 630 ? #1;D
ZX 640 FOR N=1 TO 100
KX 650 L=C(N):K=A(N):J=CB(N)
PM 660 ? #1;L:? #1;K:? #1;J
```

```
II 670 NEXT N
GY 680 CLOSE #1:POKE 77,0:GOTO 160
FM 690 GOSUB 250:GOSUB 1110:? "GETTING CH
   ECKS, PLEASE WAIT":TRAP 1000:POKE 77,1
   28:OPEN #1,4,0,"D1:CHECK.DAT"
GY 700 INPUT #1;D
WG 710 FOR NN=1 TO 100
FI 720 INPUT #1;L:INPUT #1;K:INPUT #1;J
KC 730 C(NN)=L:A(NN)=K:CB(NN)=J
PD 740 NEXT NN
YX 750 CLOSE #1:POKE 77,0:E=0
JQ 760 E=E+1:IF C(E)>0 THEN E=E:GOSUB 550
   :GOTO 540
UK 770 IF E<99 THEN 760
GD 780 E=1:GOSUB 550:GOTO 540
IY 790 GOSUB 250:? "  working on new bala
   nce..standby....";
VD 800 FOR I=1 TO 100:NB=NB+A(I):NEXT I:N
   B=NB+D
HS 810 POSITION 32,2:? "        ";:POSITI
   ON 32,2:? NB:NP=NB:NB=0:GOTO 160
GT 820 TRAP 970:LPRINT "    OUTSTANDING CH
   ECKS":LPRINT
BU 830 L=0:FOR L=1 TO 99
CL 840 IF C(L)=0 THEN 860
CT 850 LPRINT L,C(L),A(L),CB(L):FX=1
HO 860 NEXT L
DV 870 IF FX=0 THEN LPRINT "NO CHECKS IN
   MEMORY"
GV 880 LPRINT :LPRINT "  NEW ACCOUNT END
   BAL$";NP
ZW 890 RETURN
KG 900 X=3:POKE 764,255
VY 910 STK=STICK(0):STR=STRIG(0):CH=PEEK(
   764)
TF 920 POKE 752,1:IF (STK=14 OR CH=14 OR
   CH=142) THEN X=X-1:POKE 764,255:IF X<2
    THEN X=20
TC 930 IF (STK=13 OR CH=15 OR CH=143) THE
   N X=X+1:POKE 764,255:IF X>20 THEN X=2
BB 940 POSITION 2,X:? "▶":FOR DLY=1 TO 10
   :NEXT DLY:POSITION 2,X:? " "
VL 950 IF STR=0 OR CH=12 THEN E=E+X-2:FOR
    DLY=1 TO 50:NEXT DLY:POKE 764,255:RET
   URN
PN 960 GOTO 910
NC 970 GOSUB 250:? "  ***NO PRINTER***";:
   FOR DLY=1 TO 200:NEXT DLY:GOTO 890
OO 980 END
VZ 1000 ERR=PEEK(195):ERL=PEEK(186)+PEEK(
   187)*256:GOSUB 250:POKE 77,0:SOUND 0,1
   50,10,15
AK 1010 IF ERR=170 THEN ? " *** FILE NOT
   FOUND***";
UO 1020 IF ERR=144 THEN ? "***DISK PROTEC
   TED,NOT THERE***";
YG 1030 IF ERR=136 THEN ? "*** END OF FIL
   E ***";
HZ 1040 IF ERR=162 THEN ? "*** DISK FULL
   ***";
XN 1050 IF ERR=167 THEN ? "*** FILE LOCKE
   D ***";
PJ 1060 IF ERR=138 THEN ? "*** TURN ON DR
   IVE ***";
EN 1070 IF ERR=139 THEN ? "*** DEVICE NAK
   ie:wrong density**";
DA 1080 IF ERR=129 THEN ? "**IOCB ALREADY
    OPEN,CLOSED NOW**";
PJ 1090 ? ERR;:CLOSE #1
WU 1100 FOR DLY=1 TO 400:NEXT DLY:TRAP 10
   00:SOUND 0,0,0,0:IF ERL<1110 THEN 160
FA 1110 POKE 764,255:TRAP 1120:CLOSE #1:O
   PEN #1,4,0,"D1:CHECK.DAT":CLOSE #1:GOS
   UB 250:RETURN
UM 1120 POKE 764,255:GOSUB 250:? "
    Can't find D:CHECK.DAT!":FOR TIM=1 TO
    200:NEXT TIM
LP 1130 GOSUB 250:? "  Press [SPACEBAR] t
   o create a new one":FOR TIM=1 TO 200:N
   EXT TIM
FP 1140 GOSUB 250:? "      Press [ESCAPE
   ] to re-try":FOR TIM=1 TO 200:NEXT TIM
HI 1150 IF PEEK(764)=28 THEN 1110
MD 1160 IF PEEK(764)=33 THEN 1180
OX 1170 GOTO 1120
WY 1180 GOSUB 250:? "Creating CHECK.DAT"
UM 1190 POKE 764,255:TRAP 1000:CLOSE #1:O
   PEN #1,8,0,"D1:CHECK.DAT"
EZ 1200 FOR N=1 TO 301:? #1;A:NEXT N:CLOS
   E #1:GOSUB 250:RETURN
XI 1210 GOSUB 250:? "  Are you sure you w
   ant to Quit";:INPUT Q$
CL 1220 IF Q$<>"Y" THEN RETURN
XK 1230 POP :GRAPHICS 0:END
```

beat the vegas spread on NFL winners

FOOTBALL PREDICTOR

Article on page 36

LISTING 1

Don't type the TYPO II Codes!

```
NI 10 REM FOOTBALL PREDICTOR
LI 20 REM BY DAVID COWLES & BILL MARQUARD
   T
PT 30 REM (c)1987, ANTIC PUBLISHING
MS 100 REM INITIALIZATION
HZ 110 T=28:REM SET TO # OF TEAMS AT LINE
    31700
EG 120 DIM A(T),B(T),C(T),D(T),E(T),F(T),
   G(T),H(T)
XY 140 DIM RO(T),PO(T),YO(T),SO(T),RD(T),
   PD(T),YD(T),SD(T)
FX 150 DIM TN$(20*T),TEMP$(20),D$(15),K$(
   1),TS(2),C$(1),P$(40),BL$(5)
NR 160 DIM CT(T):C$=CHR$(125):Z=0
LZ 170 DIM LINE$(40):LINE$(1,1)=CHR$(18):
   LINE$(40,40)=LINE$(1,1):LINE$(2)=LINE$

GH 182 P=T/2*80:DIM PRED$(P):BL$="     "
ZS 185 FOR I=1 TO T/2:PRED$(80*I,80*I)=CH
   R$(155):NEXT I
OU 200 TN$(1)=" ":TN$(20*T)=" ":TN$(2)=TN
   $
JF 210 D$(1,3)="D1:":REM DATA DISK IS IN
   DRIVE #1
SY 290 POKE 712,208
RM 300 GRAPHICS 2:POKE 710,PEEK(712):POSI
   TION 6,4:? #6;"FOOTBALL"
IP 310 POSITION 6,5:? #6;"PREDICTOR"
XN 320 POKE 752,1:? "  FOR ENTERTAINMENT
   PURPOSES ONLY!"
FN 330 ? "  By David Cowles & Bill Marqua
   rdt"
IY 340 ? "      (c) 1987 by Antic Publishin
   g"
RR 350 FOR I=1 TO 1200:NEXT I
JK 500 FOR I=1 TO T:READ TEMP$:TN$((I-1)*
   20+1,I*20)=TEMP$:NEXT I
ZR 510 ? C$:POKE 82,Z
JU 520 POKE 764,255:? "Ensure proper disk
    is in Drive #";D$(2,2);" and"
AU 530 ? "         press RETURN."
GG 540 IF PEEK(764)=255 THEN 540
LH 550 W=Z:TRAP 1200:REM SKIP "OPEN" IF N
   O FILE ON DISK
GA 560 D$(4,11)="WKNUMBER":OPEN #1,4,0,D$
   :GET #1,W:CLOSE #1
IG 600 IF W<1 THEN 1200
LL 700 D$(4,11)="SEASTOTL":? C$:GOSUB 145
   00:GOSUB 14000
YW 1200 REM MAIN MENU
DC 1205 PRED$(1,1)=" ":PRED$(P,P)=PRED$:P
   RED$(2)=PRED$
JP 1206 FOR I=1 TO T/2:PRED$(I*80,I*80)=C
   HR$(155):NEXT I
ML 1210 GRAPHICS Z:POKE 82,Z:POKE 712,PEE
   K(710):CLOSE #1:TRAP 1200
QX 1220 POKE 764,255:POKE 752,1
UA 1230 ? LINE$;"         Current week is
   Week #";W:? LINE$
```

continued on next page

```
AS 1240 IF W=Z THEN ? "  (No weekly data
   files were loaded.)":?
MK 1250 ? "Select by number:":? :?
EW 1260 ? "   1  ENTER data for Week #";W
   +1:?
AL 1270 ? "   2  PREDICT scores for Week
   #";W+1:?
JA 1280 ? "   3  REVIEW-PRINT-REVISE week
   ly stats":?
NP 1290 ? "   4  REVIEW-PRINT season stat
   s":?
FQ 1300 ? "   5  QUIT":?
NI 1310 ? LINE$:? "Your selection =>";:IN
   PUT KY
GC 1320 IF KY<1 OR KY>5 THEN 1200
XQ 1330 ON KY GOTO 2000,4000,6000,8000,90
   00
GZ 2000 REM ENTER WEEKLY DATA
VG 2010 WK=W+1
IF 2050 FOR I=1 TO T:TRAP 2060
IP 2060 ? C$;LINE$;"       Entering stats
   for Week #";WK:? LINE$
HS 2076 ? "Enter stats for: ";TN$((I-1)*2
   0+1,I*20):?
WP 2090 ? "Total yards gained rushing    =
   >";:TRAP 2090:INPUT K:RO(I)=K
QE 2100 ? "Total yards gained passing    =
   >";:TRAP 2100:INPUT K:PO(I)=K
TC 2110 YO(I)=RO(I)+PO(I):REM TOTAL YARDS
    GAINED
ZT 2120 ? "Total points scored           =
   >";:TRAP 2120:INPUT K:SO(I)=K:?
WZ 2130 ? "Total yards given up rushing =
   >";:TRAP 2130:INPUT K:RD(I)=K
ID 2140 ? "Total yards given up passing =
   >";:TRAP 2140:INPUT K:PD(I)=K
PE 2150 YD(I)=RD(I)+PD(I):REM TOTAL YARDS
    "GIVEN-UP"
YG 2160 ? "Total points given up         =
   >";:INPUT K:SD(I)=K:?
GN 2170 ? LINE$:? "Is this information co
   rrect (y/n)";:INPUT K$
ZQ 2180 IF K$<>"Y" AND K$<>"y" THEN 2060
FT 2190 NEXT I
HW 3000 REM CREATE WEEKLY DATAFILE
JX 3010 D$(4,11)="WKDATA   ":D$(10,11)=STR
   $(WK):OPEN #1,8,0,D$
LL 3020 GOSUB 12000:W=WK
GN 3130 D$(4,11)="WKNUMBER":OPEN #1,8,0,D
   $
DR 3140 PUT #1,WK:CLOSE #1:TRAP 3200
EW 3150 D$(4,11)="SEASTOTL":GOSUB 15500:G
   OSUB 14000
OO 3180 GOTO 1200
AB 3200 ? "ERROR ";PEEK(195);"at line ";
   PEEK(186)+PEEK(187)*256:? :STOP
FJ 4000 REM PREDICT THE WINNERS
FH 4001 ? C$;LINE$;"    Predictions for F
   ootball Week #";W+1:? LINE$:TRAP 4000
AZ 4002 FOR I=1 TO T:CT(I)=Z:NEXT I:GAME=
   Z
XY 4009 IF W=Z THEN ? :? "Cannot predict
   first week!":? :GOSUB 10500:GOTO 1200
AH 4010 POKE 764,255:C=1:? C$
LC 4014 POSITION 14,9:? "□□□□□□□□□□□□";:IF
    GAME>8 THEN ? "□"
PI 4015 POSITION 0,10:? LINE$;
RG 4020 POSITION 14,10:? " GAME #";GAME+
   (GAME<(T/2));" "
LE 4025 POSITION 14,11:? "□□□□□□□□□□□□";:I
   F GAME>8 THEN ? "□"
ZA 4030 POSITION Z,12:? "Home Team"
ZA 4050 POSITION Z,14:? "Visitors "
CS 4070 POKE 53279,7:C=1
IU 4075 FOR I=1 TO T:POSITION Z,2
HN 4076 POKE 764,255
KF 4077 IF I>T THEN I=T:GOTO 4130
FW 4078 IF GAME=(T/2) THEN ? C$;"      I c
   an only predict ";T/2;" games!":? :GOT
   O 4092
US 4079 IF CT(I)=1 THEN I=I+1:GOTO 4077
UG 4080 ? "       OPTION  to scroll through
    teams":?
EG 4090 ? "       SELECT  => ";TN$((I-1)*20
   +1,I*20):?
GS 4092 IF GAME>Z THEN ? "        START   to
    print predictions.":?
HL 4093 ? "       ESC      to quit"
EX 4094 IF C<3 AND GAME<(T/2) THEN POSITI
   ON 10,10+C*2:? "=>"
XF 4095 CON=PEEK(53279)
VR 4096 IF PEEK(764)=28 THEN 1200:REM esc
    key
KQ 4100 IF CON=7 THEN 4110
TW 4104 IF CON=6 AND GAME>Z THEN GOSUB 23
   000:GAME=Z:GOTO 1200
GY 4105 IF CON=5 AND C<3 THEN TS(C)=I:POS
   ITION 10,10+C*2:? TN$((I-1)*20+1,I*20)
   :CT(I)=1
FT 4106 IF CON<>3 THEN POKE 53279,7:C=C+1
   :GOTO 4130
SB 4110 IF C>2 THEN I=T:GOTO 4130
VG 4120 IF CON=7 THEN 4095
BP 4130 NEXT I:IF C<3 THEN 4075
QC 4140 POSITION 0,18:FOR I=1 TO 14:? :NE
   XT I
WY 4150 IF MV THEN 4700
VT 4500 REM PREDICT USING SEASON TOTALS
MT 4505 A1=(A(TS(1))+E(TS(2)))/2
NL 4510 B1=(B(TS(1))+F(TS(2)))/2
FI 4520 C1=A1+B1
LQ 4525 IF D(TS(1))=Z THEN D(TS(1))=3
YA 4530 D1=C(TS(1))/D(TS(1))
QZ 4535 IF H(TS(1))=Z THEN H(TS(1))=3
CN 4540 E1=G(TS(1))/H(TS(1))
MM 4550 A2=(A(TS(2))+E(TS(1)))/2
NY 4560 B2=(B(TS(2))+F(TS(1)))/2
HB 4570 C2=A2+B2
NX 4575 IF D(TS(2))=Z THEN D(TS(2))=3
AH 4580 D2=C(TS(2))/D(TS(2))
TG 4585 IF H(TS(2))=Z THEN H(TS(2))=3
EU 4590 E2=G(TS(2))/H(TS(2))
OQ 4600 F1=(D1+E2)/2
CV 4610 G1=INT(C1/F1+0.5)
PA 4620 F2=(D2+E1)/2
EN 4630 G2=INT(C2/F2+0.5)
AB 5000 REM DISPLAY WINNER
JE 5005 GAME=GAME+1
FV 5010 POSITION 34+(G1<10),3:? G1
FX 5015 POSITION 34+(G2<10),5:? G2:?
GN 5016 ? LINE$:? "The ";
PS 5020 IF G1=G2 THEN GOSUB 5100:GOSUB 25
   000:GOTO 5030
OT 5021 IF G1>G2 THEN ? TN$(((TS(1)-1)*20
   +1),TS(1)*20);" will defeat the ";
GW 5022 ? TN$(((TS(2)-1)*20)+1,TS(2)*20);
   :IF G1>G2 THEN ? " by ";G1-G2;:GOTO 50
   24
CN 5023 ? " will defeat the ";:? TN$(((TS
   (1)-1)*20+1),TS(1)*20);" by ";G2-G1;
UV 5024 ? " point";:IF ABS(G1-G2)>1 THEN
   ? "s";
LO 5030 ? "!":? :? LINE$
MD 5032 IF G1>G2 THEN GOSUB 25000
NJ 5034 IF G2>G1 THEN GOSUB 26000
TK 5035 IF GAME=1 THEN ? "(Print option c
   oming up ...)":?
YE 5045 POKE 764,255:? "Press any key ...
   ";
HM 5047 IF PEEK(764)=255 THEN 5047
PV 5050 ? C$:GOTO 4010
DN 5100 ? TN$(((TS(1)-1)*20+1),TS(1)*20);
   "    versus    the ";
NZ 5110 ? TN$(((TS(2)-1)*20+1),TS(2)*20);
   " is a toss-up";
AR 5140 RETURN
RP 6000 REM REVIEW PAST STATS.
TG 6005 IF W=Z THEN 1200
LO 6010 ? C$;LINE$;"       Current week
   is Week #";W:? LINE$:TRAP 6010
CZ 6020 ? :? :? "Enter number of week you
    wish to review"
QJ 6030 POSITION 17,8:? "=>";:INPUT R
GT 6040 IF R<1 OR R>W THEN 6010
WI 6050 D$(4,11)="WKDATA   ":D$(10,11)=STR
   $(R):OPEN #1,4,0,D$
FY 6052 ? :? "Reading ";D$
MJ 6055 TEMP$=" Stats for week #":TEMP$(L
   EN(TEMP$)+1)=STR$(R)
DU 6060 GOSUB 16000
RF 6330 ? "Revise (correct) these stats (
   y/n)";:INPUT K$
XS 6340 IF K$<>"Y" AND K$<>"y" THEN 7000
KR 6350 ? C$:POSITION 12,0:? ">>> WARNING
    <<<<":?
RA 6360 ? "Revised statistics will be sav
   ed to disk";
MB 6370 ? "and become permanent file. Thi
   s option"
AA 6375 ? "should only be used to correct
    bad data"
VL 6376 ? "entered earlier.":?
OD 6377 ? "Do you wish to proceed (y/n)";
   :INPUT K$
DS 6380 IF K$<>"Y" AND K$<>"y" THEN 7040
AD 6382 RV=1
```

```
GN 6385 ? C$;LINE$;"New statistics -":? T
   N$((S-1)*20+1,S*20);"   Week #";R:? LI
   NE$
OR 6390 ? :? "Change:"
LH 6400 ? RO(S);" rushing yds gained to
   =>";:TRAP 6400:INPUT K:RO(S)=K
BR 6410 ? PO(S);" passing yds gained to
   =>";:TRAP 6410:INPUT K:PO(S)=K
YA 6420 YO(S)=PO(S)+RO(S)
YC 6430 ? SO(S);" points scored to
   =>";:TRAP 6430:INPUT K:SO(S)=K:?
CF 6440 ? RD(S);" rushing yds given up to
   =>";:TRAP 6440:INPUT K:RD(S)=K
SP 6450 ? PD(S);" passing yds given up to
   =>";:TRAP 6450:INPUT K:PD(S)=K
HZ 6460 YD(S)=PD(S)+RD(S)
FX 6470 ? SD(S);" points given up to
   =>";:TRAP 6470:INPUT K:SD(S)=K
NP 6471 ? :? LINE$:? :? "Is this informat
   ion correct (y/n)";:INPUT K$
TJ 6472 IF K$<>"Y" AND K$<>"y" THEN 6385
AB 6473 ? "Review stats for another team
   (y/n)";:INPUT K$
BU 6474 IF K$="Y" OR K$="y" THEN 7060
LY 6475 ? :RV=0:TRAP 40000
BQ 6480 OPEN #1,8,0,D$:GOSUB 12000:WK=R
JQ 6490 FOR I=1 TO T:A(I)=Z:B(I)=Z:C(I)=Z
   :D(I)=Z:E(I)=Z:F(I)=Z:G(I)=Z:H(I)=Z:NE
   XT I
WE 6495 GOSUB 18000:GOTO 1200
CN 7000 REM REPEAT CHOICE
YZ 7040 ? "Review stats for another team
   (y/n)";:INPUT K$
UF 7045 IF K$<>"Y" AND K$<>"y" AND RV=1 T
   HEN 6475
UO 7050 IF K$<>"Y" AND K$<>"y" THEN POP :
   GOTO 1200
JA 7060 GOSUB 16300:IF KY=3 THEN 6330
QD 7070 GOTO 7000
WC 8000 REM REVIEW SEASON TOTALS
JS 8010 D$(4,11)="SEASTOTL":OPEN #1,4,0,D
   $:? "Reading ";D$
NK 8020 TEMP$="  Season totals":GOSUB 160
   00
ZQ 8030 GOSUB 7000:GOTO 8030
ZM 9000 REM EXIT PROGRAM
OY 9010 POKE 752,Z:END
DI 10000 REM PRINT STATS
BA 10005 ? C$;LINE$;
MX 10006 ? TN$((S-1)*20+1,S*20);TEMP$:? L
   INE$
AE 10010 ? "Offense:"
DW 10020 ? "        rushing yards gained
   =>";BL$(1,5-LEN(STR$(RO(S))));RO(S)
MR 10030 ? "        passing yards gained
   =>";BL$(1,5-LEN(STR$(PO(S))));PO(S)
GQ 10050 ? "        points scored

   =>";BL$(1,5-LEN(STR$(SO(S))));SO(S):
   ?
WH 10060 ? "Defense:"
SM 10070 ? "        rushing yards given u
   p =>";BL$(1,5-LEN(STR$(RD(S))));RD(S)
BH 10080 ? "        passing yards given u
   p =>";BL$(1,5-LEN(STR$(PD(S))));PD(S)
PZ 10100 ? "        points given up
   =>";BL$(1,5-LEN(STR$(SD(S))));SD(S):
   ?
BO 10105 ? LINE$:GOSUB 10500:RETURN
QP 10500 REM WAIT FOR KEYPRESS
ZG 10510 POKE 764,255:? "Press any key to
    continue ..."
WK 10520 IF PEEK(764)=255 THEN 10520
IC 10530 POKE 764,255:RETURN
LN 12000 REM SAVE STATS
WQ 12003 ? :? "Saving  ";D$
HA 12005 FOR I=1 TO T
BZ 12010 K=RO(I):GOSUB 20000:K=PO(I):GOSU
   B 20000
HX 12020 K=YO(I):GOSUB 20000:K=SO(I):GOSU
   B 20000
LJ 12030 K=RD(I):GOSUB 20000:K=PD(I):GOSU
   B 20000
RH 12040 K=YD(I):GOSUB 20000:K=SD(I):GOSU
   B 20000
SP 12090 NEXT I:CLOSE #1:RETURN
WN 13000 REM READ DATAFILES
LK 13005 IF D$(4,9)="WKDATA" THEN D$(10,1
   1)="  ":D$(10,11)=STR$(J)
NN 13010 OPEN #1,4,0,D$:? "Reading ";D$
GL 13020 FOR I=1 TO T
MU 13030 GOSUB 21000:A(I)=A(I)+K:GOSUB 21
   000:B(I)=B(I)+K
XG 13040 GOSUB 21000:C(I)=C(I)+K:GOSUB 21
   000:D(I)=D(I)+K
HS 13050 GOSUB 21000:E(I)=E(I)+K:GOSUB 21
   000:F(I)=F(I)+K
SE 13060 GOSUB 21000:G(I)=G(I)+K:GOSUB 21
   000:H(I)=H(I)+K
RO 13110 NEXT I:CLOSE #1:RETURN
BY 13500 REM UPDATE "SEASON TOTALS" FILE
UX 13510 D$(4,11)="SEASTOTL":OPEN #1,8,0,
   D$
QW 13515 ? "Saving  ";D$
HA 13520 FOR I=1 TO T
JN 13530 K=A(I):GOSUB 20000:K=B(I):GOSUB
   20000
MN 13540 K=C(I):GOSUB 20000:K=D(I):GOSUB
   20000
PN 13550 K=E(I):GOSUB 20000:K=F(I):GOSUB
   20000
SN 13560 K=G(I):GOSUB 20000:K=H(I):GOSUB
   20000
SD 13610 NEXT I:CLOSE #1:RETURN
IO 14000 REM DETERMINE WEEKLY AVERAGES
GJ 14010 FOR I=1 TO T
YO 14020 A(I)=A(I)/W:B(I)=B(I)/W
DM 14030 C(I)=C(I)/W:D(I)=D(I)/W
IK 14040 E(I)=E(I)/W:F(I)=F(I)/W
NI 14050 G(I)=G(I)/W:H(I)=H(I)/W
CP 14060 NEXT I:RETURN
KO 14500 REM ENTER SEASON TOTALS
LA 14510 FOR I=1 TO T:A(I)=Z:B(I)=Z:C(I)=
   Z:D(I)=Z
UH 14515 E(I)=Z:F(I)=Z:G(I)=Z:H(I)=Z:NEXT
    I
HX 14520 GOSUB 13000:RETURN
LY 15500 REM UPDATE SEASON TOTALS
AD 15510 IF W>1 THEN GOSUB 14500
HE 15520 FOR I=1 TO T
EF 15530 A(I)=A(I)+RO(I):B(I)=B(I)+PO(I)
SD 15540 C(I)=C(I)+YO(I):D(I)=D(I)+SO(I)
TH 15550 E(I)=E(I)+RD(I):F(I)=F(I)+PD(I)
HF 15560 G(I)=G(I)+YD(I):H(I)=H(I)+SD(I)
SW 15570 NEXT I:CLOSE #1
LU 15580 GOSUB 13500:RETURN
JS 16000 REM ENTER STATS.
WH 16005 TRAP 40000
GN 16010 FOR I=1 TO T
LR 16020 GOSUB 21000:RO(I)=K:GOSUB 21000:
   PO(I)=K
VL 16030 GOSUB 21000:YO(I)=K:GOSUB 21000:
   SO(I)=K
MP 16040 GOSUB 21000:RD(I)=K:GOSUB 21000:
   PD(I)=K
WJ 16050 GOSUB 21000:YD(I)=K:GOSUB 21000:
   SD(I)=K
TQ 16095 NEXT I:CLOSE #1
ZR 16100 REM SELECTION & PRINTING
SM 16110 ? C$;LINE$;"   Reviewing ... ";T
   EMP$:? LINE$:? :TRAP 16100
SK 16120 ? "   [1] Print totals for all ";
   T;" teams":?
HN 16140 ? "   [2] Print totals for select
   ed teams"
IF 16145 IF KY=3 THEN ? "      (includes
   revision option)"
QO 16150 ? :? "   [3] Return to Main Menu"
   :?
CY 16160 ? LINE$:? "     Your selection
   =>";:INPUT K
KJ 16170 ON K GOTO 16200,16300,16800
RX 16180 IF K<1 OR K>3 THEN 16110
GQ 16200 GOSUB 17000:GOTO 16110
PW 16300 ? C$;LINE$;"   Reviewing ... ";T
   EMP$:? LINE$:? :S=Z
NC 16310 FOR I=1 TO T:POSITION 0,5
NU 16320 ? "      [OPTION] to scroll throug
   h teams":?
OI 16330 ? "      [SELECT] the ";TN$((I-1)*
   20+1,I*20):POKE 53279,7
SA 16340 IF PEEK(53279)=5 THEN S=I:I=T:PO
   KE 53279,7:GOTO 16360
DX 16350 IF PEEK(53279)<>3 THEN 16340
WI 16360 NEXT I:IF S<1 THEN 16310
GZ 16370 GOSUB 10000:RETURN
AI 16800 POP :GOTO 1200
NR 17000 REM PRINT STATS FOR ALL TEAMS
SC 17002 ? :? "Use screen or printer (S/P
   )";:INPUT K$
EX 17004 PR=Z:IF K$="P" OR K$="p" THEN PR
   =1
RP 17010 POKE 764,255
PP 17015 IF  NOT PR THEN 17170
```

continued on next page

```
OT 17020 ? :? "Set-up printer and press a
   ny key."
ZW 17030 IF PEEK(764)=255 THEN 17030
GL 17035 CLOSE #2:OPEN #2,8,0,"P:"
QR 17040 ? #2;TEMP$:? #2:? #2
YV 17050 ? #2;"                  TEAM
         OFFENSE";
PH 17060 ? #2;"
   DEFENSE":? #2
NK 17070 ? #2;"                          RUSH
          PASS          PTS";
RG 17080 ? #2;"                RUSH      PASS
        PTS":? #2
UY 17090 LP=7+T:FOR I=1 TO T
WQ 17100 ? #2;TN$((I-1)*20+1,I*20);" ";BL
   $(1,5-LEN(STR$(RO(I))));RO(I);BL$;
GW 17110 ? #2;BL$(1,5-LEN(STR$(PO(I))));P
   O(I);BL$;
OT 17120 ? #2;BL$(1,5-LEN(STR$(SO(I))));S
   O(I);BL$;
SS 17130 ? #2;"   ";BL$(1,5-LEN(STR$(RD(I
   ))));RD(I);BL$;
ED 17140 ? #2;BL$(1,5-LEN(STR$(PD(I))));P
   D(I);BL$;
UW 17150 ? #2;BL$(1,5-LEN(STR$(SD(I))));S
   D(I)
MJ 17160 NEXT I:CLOSE #2:GOSUB 19500:GOTO
    17180
EO 17170 FOR S=1 TO T:GOSUB 10000:NEXT S:
   K$=""
IY 17180 POKE 764,255:RETURN
OW 18000 REM REVISE SEASON TOTAL FILES
PL 18010 ? :? "Re-totalling all files - t
   his may take"
QO 18020 ? "a few minutes...":?
PG 18030 D$(4,11)="WKDATA  "
PU 18040 FOR J=W TO 1 STEP -1:GOSUB 13000

GI 18050 NEXT J:GOSUB 13500:GOSUB 14000:R
   ETURN
ZZ 19500 REM SKIP TO TOP OF PAGE
HS 19510 FOR I=1 TO 66-LP
LS 19520 LPRINT :NEXT I:LP=Z:RETURN
IG 20000 REM CONVERT TO TWO BYTES
MP 20010 K1=INT(K/256):IF K1>255 THEN K1=
   255
TL 20015 PUT #1,K1
IO 20020 K2=K-(K1*256):IF K2>255 THEN K2=
   255
ZL 20030 PUT #1,K2:RETURN
JN 21000 REM RECONSTRUCT TWO-BYTE NUMBER
QF 21010 GET #1,K1:K=256*K1
RR 21020 GET #1,K2:K=K+K2
DM 21030 RETURN
RR 23000 REM PRINT PREDICTION REPORT
KU 23010 ? C$;"Set-up printer and press a
   ny key ...":POKE 764,255
UU 23011 IF PEEK(764)=255 THEN 23011
YK 23012 TRAP 23000:POKE 764,255
OL 23014 ? :? "How many copies";:INPUT K
BR 23016 FOR J=1 TO K
DO 23018 LPRINT " Football Predictions fo
   r Week #";W+1:LPRINT
YU 23030 LPRINT "      Favorite
        Underdog              SPREAD":LPRINT
XD 23040 LPRINT PRED$:LP=GAME+4
RK 23050 GOSUB 19500:NEXT J
WV 23060 TRAP 40000:RETURN
YL 25000 REM FIRST TEAM IS FAVORITE
JD 25010 PRED$((GAME-1)*80+1,GAME*80-60)=
   TN$(((TS(1)-1)*20+1),TS(1)*20)
CS 25020 PRED$((GAME-1)*80+26,GAME*80-35)
   =TN$(((TS(2)-1)*20+1),TS(2)*20)
OK 25030 PRED$(GAME*80-30+(1*(G1-G2)<10))
   =STR$(G1-G2):RETURN
XI 26000 REM SECOND TEAM IS FAVORITE
NM 26010 PRED$((GAME-1)*80+1,GAME*80-60)=
   TN$(((TS(2)-1)*20+1),TS(2)*20)
YL 26020 PRED$((GAME-1)*80+26,GAME*80-35)
   =TN$(((TS(1)-1)*20+1),TS(1)*20)
OG 26030 PRED$(GAME*80-30+(1*(G2-G1)<10))
   =STR$(G2-G1):RETURN
ST 31700 REM 28 NFL teams - see LINE 110
VV 31702 DATA Atlanta Falcons,Buffalo Bil
   ls
MB 31704 DATA Chicago Bears,Cincinnati Be
   ngals
TB 31706 DATA Cleveland Browns,Dallas Cow
   boys
WT 31708 DATA Denver Broncos,Detroit Lion
   s
FW 31710 DATA Green Bay Packers,Houston O
   ilers
FA 31712 DATA Indianapolis Colts,Kansas C
   ity Chiefs
IB 31714 DATA Los Angeles Raiders,Los Ang
   eles Rams
MT 31716 DATA Miami Dolphins,Minnesota Vi
   kings
WE 31718 DATA New England Patriots,New Or
   leans Saints
IA 31720 DATA New York Giants,New York Je
   ts
KJ 31722 DATA Philadelphia Eagles,Pittsbu
   rgh Steelers
MK 31724 DATA San Diego Chargers,San Fran
   cisco 49ers
ZH 31726 DATA Seattle Seahawks,St. Louis
   Cardinals
ZT 31728 DATA Tampa Bay Buccaneers,Washin
   gton Redskins
```

---

lesson 5: introducing bit-mapping

ATARI ANIMATION

Article on page 16

LISTING 1

Don't type the TYPO II Codes!

```
MP 2 REM DOT & TEXT DEMO
AN 4 REM BY SHERER/JACKSON
QH 6 REM (c)1987, ANTIC PUBLISHING
YJ 10 DIM TEXT$(4),HOLD$(1)
KK 20 TEXT$="v^ ":X=5:Y=20
QH 30 GRAPHICS 8+16:SAVMSC=PEEK(88)+PEEK(
   89)*256:WIDTH=40
DD 40 POKE 710,0
MQ 45 GOSUB 1000
LZ 50 SCRN=SAVMSC+Y*WIDTH+X
CZ 60 FOR Z=1 TO LEN(TEXT$)
DK 70 HOLD$=TEXT$(Z,Z):GOSUB 140
UE 80 CHAR=PEEK(756)*256+TEMP*8
VO 90 FOR ROW=0 TO 7
UH 100 POKE SCRN+ROW*WIDTH,PEEK(CHAR+ROW)

AP 110 NEXT ROW:NEXT Z
XN 120 COLOR 1
SP 130 GOTO 45
KK 140 TEMP=ASC(HOLD$):IF TEMP>127 THEN T
   EMP=TEMP-128
OC 150 IF TEMP>31 AND TEMP<96 THEN TEMP=T
   EMP-32:RETURN
BX 160 IF TEMP<32 THEN TEMP=TEMP+64
ZL 170 RETURN
NM 1000 COLOR 1:PLOT 0,100:DRAWTO 106,25:
   DRAWTO 212,100:DRAWTO 190,85:DRAWTO 25
   0,45:DRAWTO 319,100
QO 1040 V=STICK(0)
HC 1060 IF V=14 OR V=10 OR V=6 THEN Y=Y-2

HF 1065 IF V=13 OR V=9 OR V=5 THEN Y=Y+2
EU 1070 IF V=11 OR V=10 OR V=9 THEN X=X-1

YP 1075 IF V=7 OR V=6 OR V=5 THEN X=X+1
AX 1080 RETURN
```

arithmetic drill that kids really use

MATH FLASHCARDS

Article on page 44

LISTING 1

Don't type the TYPO II Codes!

```
CS 10 REM FLASH CARDS
QH 15 REM BY ANDY BARTON
PS 20 REM (c)1987, ANTIC PUBLISHING
FW 30 GOTO 10000
DO 50 IF PEEK(MJIF)<TLIM THEN RETURN
YL 60 POP :TOT=TOT+1:POKE 712,68:CT=15
FM 70 PAUSE=PAUSE+25:GOSUB 610
YE 80 IF PAUSE<201 THEN POSITION 6,0:? #6
   ;TOT:ERROR=REP:EX=X:GOTO 370
IC 90 ? #6;"▣":POSITION 0,3:? #6;"HEY KID
   !! SPEED UP!!":FOR Z=1 TO 2500:NEXT Z:
   ? #6;"▣"
PV 100 GOTO PS
PW 110 REM MAIN PROGRAM
AM 120 REM ADDITION
OB 130 X=INT(RND(0)*10):SETCOLOR 4,0,0:GO
   TO 240
PZ 140 A=X+SET:RETURN
MP 150 REM SUBTRACTION
EE 160 X=INT(RND(0)*10):X=X+SET:SETCOLOR
   4,0,0:GOTO 240
QV 170 A=X-SET:RETURN
XK 180 REM MULTIPLY
ON 190 X=INT(RND(0)*10):SETCOLOR 4,0,0:GO
   TO 240
PK 200 A=X*SET:RETURN
KN 210 REM DIVISION
CY 220 X=INT(RND(0)*10):X=X*SET:SETCOLOR
   4,0,0:GOTO 240
RE 230 A=X/SET:RETURN
NT 240 REM PART 2
IP 250 POSITION 0,0:? #6;"TOTAL ";TOT:POS
   ITION 0,1:? #6;"RIGHT ";COR
NV 260 POSITION 12,0:? #6;"SET   ";SET:PO
   SITION 12,1:? #6;"COUNT ";CT;" "
YF 270 IF ERROR>0 THEN ERROR=ERROR-1:IF E
   RROR/2=INT(ERROR/2) THEN SETCOLOR 4,3,
   10:X=EX:CT=CT+1
QM 280 GOTO PS
RE 285 REM PROBLEM SET UP - VERTICAL
PF 290 POSITION 8,5:IF X<10 THEN ? #6;" "
   ;
LY 300 ? #6;X
FM 310 POSITION 7,6:? #6;SIGN$;" ";SET
CX 320 POSITION 7,7:? #6;"___"
OW 330 GOTO 360
OI 335 REM PROBLEM SET UP - HORIZONTAL
NW 340 POSITION 5,6:IF X<10 THEN ? #6;" "
   ;
YE 350 ? #6;X;" / ";SET;" =    "
RF 360 GOSUB MP+10
OG 370 POKE JIFF,0:POKE MJIF,0:ANS=0:POSI
   TION XA,YA:? #6;"  ":IF A<10 THEN 420
FS 375 KEY=PEEK(CH):IF KEY=0 THEN KEY=1
UW 380 GOSUB 50
QJ 390 IF KEYCODE$(KEY,KEY)=" " THEN 375
VZ 400 POKE CH,255:POSITION XA,YA:? #6;KE
   YCODE$(KEY,KEY)
WT 410 ANS=10*VAL(KEYCODE$(KEY,KEY))
EU 420 KEY=PEEK(CH):IF KEY=0 THEN KEY=1
UN 430 GOSUB 50
DI 440 IF KEYCODE$(KEY,KEY)=" " THEN 420
PQ 450 POKE CH,255:POSITION XA+1,YA:? #6;
   KEYCODE$(KEY,KEY)
DF 460 ANS=ANS+VAL(KEYCODE$(KEY,KEY))
ZI 470 FOR Z=0 TO 100:NEXT Z:TOT=TOT+1
YR 480 IF ANS<>A THEN POKE 712,68:CT=COUN
   T+1:PAUSE=BUZZ:GOSUB 620:POSITION 6,0:
   ? #6;TOT:ERROR=REP:EX=X:GOTO 370
FG 490 COR=COR+1:PAUSE=CTUNE:GOSUB 660
WQ 500 CT=CT-1
WV 510 IF CT>0 THEN 540
JP 520 CT=COUNT:SET=SET+1:PAUSE=STUNE:GOS
   UB 660
AZ 530 IF SET>9 THEN ? #6;"▣":POSITION 5,
   5:? #6;"GOOD WORK":PAUSE=ETUNE:GOSUB 6
   60:FOR Z=0 TO 100:NEXT Z:RUN
NW 540 GOTO MP
TQ 600 REM SOUND SUBS
GK 610 REM BUZZER
RL 620 FOR Z=1 TO PAUSE
ST 630 SOUND 0,50,6,10
MZ 640 NEXT Z:GOTO 710
NN 650 REM BELL
RT 660 FOR Z=1 TO PAUSE
VB 670 T=(INT(RND(0)*7)+1)*5+40
WG 680 FOR L=14 TO 4 STEP -2
PJ 690 SOUND 0,T,10,L
QM 700 NEXT L:NEXT Z
RF 710 SOUND 0,0,0,0:RETURN
ZU 9990 REM INITIALIZE
LI 10000 DIM KEYCODE$(256):KEYCODE$(1)="
   ":KEYCODE$(256)=" ":KEYCODE$(2)=KEYCOD
   E$
ZG 10010 KEYCODE$(24,31)="4 36 521":KEYCO
   DE$(48,53)="9 07 8"
UA 10020 CH=764:MJIF=19:JIF=20:DIM SIGN$(
   1)
XB 10030 CLOSE #3:OPEN #3,4,0,"K:"
XT 10040 GRAPHICS 2+16:SETCOLOR 0,13,6
IF 10050 DIM CH$(1024):CH$(1)=" ":CH$(102
   4)=" ":CH$(2)=CH$
MQ 10060 A=ADR(CH$):B=INT(A/512+1)*2:CB=B
   *256-A+1
BC 10070 SHIFT=ADR("hh[illegible]"):X=USR(SHIF
   T,57344,B*256,512):POKE 756,B
QT 10080 CH$(CB+120,CB+127)="[illegible]"
AF 10085 CH$(CB+448,CB+455)="[illegible]"
UN 10100 ? #6;"▣":POSITION 5,2:? #6;"+ aD
   D"
EG 10110 POSITION 5,4:? #6;"- sUBTRACT"
CI 10120 POSITION 5,6:? #6;"X mULTIPLY"
IH 10130 POSITION 5,8:? #6;"/ dIVIDE"
IE 10140 GET #3,G
SH 10150 IF CHR$(G)="A" OR CHR$(G)="+" TH
   EN SIGN$="+":MP=130:PS=290:XA=8:YA=8:G
   OTO 10200
SL 10160 IF CHR$(G)="S" OR CHR$(G)="-" TH
   EN SIGN$="-":MP=160:PS=290:XA=8:YA=8:G
   OTO 10200
BY 10170 IF CHR$(G)="M" OR CHR$(G)="X" TH
   EN SIGN$="X":MP=190:PS=290:XA=8:YA=8:G
   OTO 10200
SK 10180 IF CHR$(G)="D" OR CHR$(G)="/" TH
   EN SIGN$="/":MP=220:PS=340:XA=13:YA=6:
   GOTO 10200
XH 10190 GOTO 10100
PP 10200 ? #6;"▣":POSITION 4,1:? #6;"HI K
   ID"
MU 10210 POSITION 0,3:? #6;"WHAT SET DO Y
   OU WANT"
JH 10220 GET #3,G:IF G<49 OR G>57 THEN GO
   TO 10220
IZ 10230 ? #6;"▣"
LC 10240 SET=VAL(CHR$(G)):TOT=0:COR=0:COU
   NT=15:CT=COUNT
EQ 10250 TLIM=5:REPEAT=3:REP=REPEAT*2-1
EE 10260 CTUNE=5:STUNE=20:ETUNE=100:BUZZ=
   20
UK 10270 GOTO MP
```

LISTING 2

```
VT 10 REM FLASH CARDS, LISTING 2
PY 20 REM BY ANDY BARTON
FJ 30 REM (c) 1985,1987 ANTIC PUBLISHING
KV 35 REM (CREATES LINE 10070)
EV 40 REM (LINES 10-250 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINE 70 AS NECESSARY.)
PR 60 DIM FN$(20),TEMP$(20),AR$(93):DPL=P
   EEK(10592):POKE 10592,255
ES 70 FN$="D:LINE":REM THIS IS THE NAME O
   F THE DISK FILE TO BE CREATED
RD 80 ? "▣Disk or Cassette?";:POKE 764,25
   5
PY 90 IF  NOT (PEEK(764)=18 OR PEEK(764)=
   58) THEN 90
TH 100 IF PEEK(764)=18 THEN FN$="C:"
VB 110 POKE 764,255:GRAPHICS 0:? "     AN
   TIC'S GENERIC BASIC LOADER"
MY 120 ? ,"BY CHARLES JACKSON"
KB 130 POKE 10592,DPL:TRAP 200
PU 140 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LW 150 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
```

continued on next page

```
BQ 160 AR$="":READ AR$
YC 170 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DM 180 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")     "
BK 190 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 160
MM 200 IF PEEK(195)=5 THEN ? :? :? "TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CM 210 IF C<LN+1 THEN ? :? "TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
UQ 220 IF FN$="C:" THEN ? :? " Prepare ca
   ssette, press [RETURN]"
AR 230 OPEN #1,8,0,FN$
PV 240 POKE 766,1:? #1;A$;:POKE 766,0
AL 250 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
GK 1000 DATA 106
NK 1010 DATA 049048048055048032083072073
   070084061065068082040034104104133241104
   133240104133213104133212104
GL 1020 DATA 1332391041332381600001772401
   45212230212208002230213230240208002230
   241198238208234198239016230
KA 1030 DATA 0960340410580880610850830820
   40083072073070084044053055051052052044
   066042050053054044053049050
PG 1040 DATA 0410580800790750690320550530
   54044066155
```

game of the month

RESISTORS

Article on page 24

LISTING 1

```
OF 2 REM RESISTORS
TX 3 REM BY CHUCK ROSKO
QF 4 REM (c)1987, ANTIC PUBLISHING
JA 5 GOSUB 31000
JF 10 GRAPHICS 17:GOSUB 19000:GOSUB 26300
   :GOSUB 26000:GOSUB 85:GOSUB 26400:DI=9
   :GOSUB 26515:GOSUB 26050:GOTO 105
GQ 20 WT=WT-1
BQ 25 POSITION 9,1:? #6;"00":T=9*(WT>9)+1
   0*(WT<10):POSITION T,1:? #6;WT:IF WT<=
   0 THEN 500
ZT 30 RETURN
VE 35 FOR T=1 TO 10:POSITION 10-T,14:? #6
   ;A$(1,T):POSITION 10,14:? #6;A$(21-T,2
   0):SOUND 0,10*T,10,10-T:NEXT T
CC 40 FOR T1=1 TO 700:NEXT T1:COLOR 160:P
   LOT 0,14:DRAWTO 19,14:RETURN
OF 45 A$="  fully recharged  ":GOSUB 35:
   GOSUB 20:GOTO 105
SM 50 POKE 711,15:SOUND 0,125,12,6:FOR Z=
   1 TO 50:NEXT Z:SOUND 0,0,0,0:POKE 711,
   180
FG 55 FOR Z=1 TO 100:NEXT Z:GOSUB 20:GOTO
    105
FU 60 T=13*(T1>99)+14*(T1>9 AND T1<100)+1
   5*(T1<10):SOUND 0,50,14,10:POSITION 13
   ,22:? #6;"000"
DU 65 POSITION T,22:? #6;T1:SOUND 0,0,0,0
   :RETURN
TI 70 T=1*(SCR>999 AND SCR<10000)+2*(SCR>
   99 AND SCR<1000)+3*(SCR>9 AND SCR<100)
   +4*(SCR<10)
SJ 75 IF SCR>9999 THEN SCR=0:POSITION 0,0
   :? #6;"00000"
WB 80 SOUND 0,50,10,10:POSITION T,1:? #6;
   SCR:SOUND 0,0,0,0:RETURN
EH 85 A$=" PLEASE  WAIT WHILE ":GOSUB 35:
   A$="NEW CIRCUT IS FORMED":GOSUB 35:RET
   URN
ZA 90 SOUND 0,200,10,10:A=USR(1536,ADR(S$
   )+70*Y+X):FOR Z=1 TO 10:NEXT Z:SOUND 0
   ,0,0,0:RETURN
XH 105 J=STICK(0):POKE 1588,126+M:M=-1*M+
   1:SOUND 0,200,10,10:A=USR(1536,ADR(S$)
   +70*Y+X):SOUND 0,0,0,0
LF 107 POKE 16,112:POKE 53774,112:POKE 77
   ,0
DS 110 IF STRIG(0)=0 THEN POKE 1588,R:A=U
   SR(1536,ADR(S$)+70*Y+X):FOR Z=1 TO 200
   :NEXT Z:GOTO 105
MS 115 IF J=15 THEN 105
CV 120 GOTO 120+(R-200)
TU 124 XD=(J=7)-(J=11):YD=(J=13):GOTO 135
SC 125 XD=(J=7)-(J=11):YD=-(J=14):GOTO 13
   5
BY 126 XD=(J=7):YD=(J=13)-(J=14):GOTO 135
JU 127 XD=-(J=11):YD=(J=13)-(J=14):GOTO 1
   35
NB 135 IF XD=0 AND YD=0 THEN 50
CB 140 IF X+(XD*5)>57 OR X+(XD*5)<2 THEN
   50
XN 145 IF Y+(YD*3)>27 OR Y+(YD*3)<0 THEN
   50
WD 150 T=(70*Y+X+287):T1=INT(RND(0)*4)+20
   4:S$(T,T)=CHR$(T1):R=PEEK(39209+20*(YD
   *3)+(XD*5))
MY 156 IF R=60 THEN 300
YL 157 IF R>207 AND R<216 THEN 255
SS 160 GOTO 170*(XD=1)+180*(XD=-1)+190*(Y
   D=1)+200*(YD=-1)
QH 170 X=X+1:POKE 1588,75:GOSUB 90:X=X+1:
   POKE 1588,73:GOSUB 90:X=X+1:GOSUB 90:X
   =X+1:POKE 1588,74:GOSUB 90
YI 175 X=X+1:POKE 1588,126:GOSUB 90:GOSUB
    20:GOTO 105
HM 180 X=X-1:POKE 1588,74:GOSUB 90:X=X-1:
   POKE 1588,73:GOSUB 90:X=X-1:GOSUB 90:X
   =X-1:POKE 1588,75:GOSUB 90
ZA 185 X=X-1:POKE 1588,126:GOSUB 90:GOSUB
    20:GOTO 105
AP 190 Y=Y+1:POKE 1588,72:GOSUB 90:Y=Y+1:
   GOSUB 90:Y=Y+1:GOSUB 90:GOSUB 20:GOTO
   105
HG 200 Y=Y-1:POKE 1588,72:GOSUB 90:Y=Y-1:
   GOSUB 90:Y=Y-1:GOSUB 90:GOSUB 20:GOTO
   105
UY 255 K=R-207:T3=(S(K)=0)-(S(K)=1):T4=N(
   K)*T3:GOTO 265+(5*S(K))
LX 265 COLOR 157:PLOT P(K),16:COLOR 143:P
   LOT P(K),17:COLOR 158:PLOT P(K),18:GOT
   O 275
NI 270 COLOR 186:PLOT P(K),16:COLOR 187:P
   LOT P(K),17:COLOR 188:PLOT P(K),18
UL 275 FOR T1=GES TO (GES+T4) STEP T3:COL
   OR 160:PLOT 8+(XD*5),8+(YD*3):DRAWTO 1
   0+(XD*5),8+(YD*3):GOSUB 60
SE 280 A=USR(1536,ADR(S$)+70*Y+X):NEXT T1
   :GES=GES+T4:IF GES=TOT THEN 1000
TE 285 S(K)=-1*S(K)+1:T=(70*Y+X+287):T1=I
   NT(RND(0)*4)+204:S$(T,T)=CHR$(T1):R=T1
   :GOTO 105
YI 300 IF WT=99 THEN 330
WR 305 X=X+(XD*5):Y=Y+(YD*3):A=USR(1536,A
   DR(S$)+70*Y+X)
ZB 310 FOR T=WT TO (WT+20):SOUND 0,T1,10,
   10
BY 315 T1=9*(T>9)+10*(T<10):POSITION T1,1
   :? #6;T:WT=WT+1:SOUND 0,0,0,0:IF T=99
   THEN 330
KW 317 NEXT T
ZY 320 T=70*Y+X+287:S$(T-1,T-1)=CHR$(202)
   :S$(T+1,T+1)=CHR$(203):T1=INT(RND(0)*4
   )+204:S$(T,T)=CHR$(T1):R=T1
MN 325 GOSUB 90:GOTO 105
QK 330 A$="  FULLY  RECHARGED  ":GOSUB 35
   :GOTO 320
EF 500 FOR T=100 TO 255 STEP 5:FOR T1=0 T
   O 3:SOUND T1,T-T1,14,10:NEXT T1:NEXT T
YL 502 FOR T=1 TO 500:NEXT T:FOR T=0 TO 3
   :SOUND T,0,0,0:NEXT T
SO 505 A$=" TASK NOT COMPLETED ":GOSUB 35
   :A$="ELECTRON CHARGE GONE":GOSUB 35
BH 510 LV=LV-1:IF LV=0 THEN 525
UO 515 POSITION 17,1:? #6;LV:A$="    ELECT
   RONS  REMAIN":A$(2,2)=CHR$(LV+144):GOS
   UB 35:GOTO 1020
UI 525 POKE 708,15:POKE 709,15:POKE 710,1
   5:POKE 711,15:FOR Z=15 TO 0 STEP -1:SO
   UND 0,Z*10,10,15-Z
KG 530 POKE 708,Z:POKE 709,Z:POKE 710,Z:P
   OKE 711,Z:NEXT Z:POSITION 0,0:? #6;CHR
   $(125)
HW 535 POKE 708,70:POKE 709,104:POKE 710,
```

```
   140:POKE 711,180:A$="SEVERE POWER FAILURE ":GOSUB 35
FG 540 A$="YOUR FINAL SCORE IS ":GOSUB 35:POSITION 10,10:? #6;SCR:FOR Z=1 TO 500:NEXT Z
DB 545 GOSUB 31000:GRAPHICS 17:POKE 756,PEEK(106)+1:GOSUB 26000
WT 546 GOSUB 85:GOSUB 26410:GOSUB 26515:GOSUB 26050:GOTO 1020
GO 1000 FOR T=0 TO 3:SOUND T,255-T,14,10:NEXT T:A$=" CIRCUT  COMPLETED  ":GOSUB 25
VB 1005 U=USR(ADR("h[illegible]")):FOR Z=0 TO 3:SOUND Z,0,0,0:NEXT Z
ZB 1010 FOR T1=WT TO 1 STEP -1:SCR=SCR+1:GOSUB 70:NEXT T1:DI=DI-1:IF DI=1 THEN DI=1
YN 1020 GOSUB 85:GOSUB 26005:GOSUB 26410:GOSUB 26515:GOSUB 26070:WT=99:GES=0:POSITION 8,1:? #6;"099"
KG 1025 A$=" CIRCUT IS COMPLETED":GOSUB 35:GOTO 105
OF 19000 REM ASSEMBLY CODE
YW 19002 DIM ZZ$(32),A$(20),S$(2800),T$(70),N(8),P(8),S(8)
PW 19010 ZZ$="hh[illegible]"
HC 19030 POKE 106,PEEK(106)-5:GRAPHICS 17:START=(PEEK(106)+1)*256:POKE 752,1
GP 19035 A=USR(ADR(ZZ$),57344,START):A=USR(ADR(ZZ$),57344,START+512):RESTORE 25000
CQ 19040 FOR X=0 TO 504 STEP 8:FOR Y=0 TO 7:READ Z:POKE X+Y+START,Z:NEXT Y:NEXT X
OQ 19045 GRAPHICS 17:POKE 756,PEEK(106)+1:RETURN
QV 25000 DATA 0,0,0,0,0,0,0,0,44,44,44,44,44,44,44,44,102,238,238,102,51,0,0,0
PB 25002 DATA 0,0,255,0,255,255,0,0,0,0,15,24,51,39,46,44,44,46,39,51,24,15,0,0
MZ 25004 DATA 0,0,240,24,204,228,116,52,52,116,228,204,24,240,0,0,44,110,207,159,159,207,110,44
LJ 25006 DATA 60,102,195,24,255,255,126,60,55,119,239,239,239,239,119,55,236,238,223,223,223,223,238,236
XK 25008 DATA 231,231,207,207,207,199,231,231,189,189,57,123,123,57,189,189,182,182,36,109,109,36,182,182
HF 25010 DATA 255,255,255,255,255,255,255,255,255,195,153,153,153,129,195,255,255,199,135,231,231,129,129,255
MD 25012 DATA 255,131,249,193,159,129,193,255,255,131,249,225,243,153,129,255,255,243,227,203,153,129,243,255
MP 25014 DATA 255,193,159,131,249,129,131,255,255,195,143,131,153,153,195,255,255,131,241,241,227,199,143,255
JC 25016 DATA 255,195,153,195,153,153,195,255,255,195,153,153,193,241,195,255,60,102,195,129,129,129,129,129
IF 25018 DATA 129,129,129,129,129,129,129,129,129,129,129,129,129,129,195,102,60,60,126,255,255,255,255,255,255
AN 25020 DATA 255,255,255,255,255,255,126,60,52,52,52,52,52,52,52,52,15,0,15,252,15,0,15,255
BJ 25022 DATA 60,118,118,118,126,126,118,0,124,118,118,126,115,127,126,0,62,119,112,112,119,127,62,0
HC 25024 DATA 124,118,115,115,119,127,126,0,126,112,124,112,112,126,126,0,126,112,112,124,112,112,112,0
KW 25026 DATA 62,115,112,119,115,127,62,0,118,118,118,126,126,118,118,0,62,62,28,28,28,62,62,0
JX 25028 DATA 14,14,14,14,110,126,60,0,102,108,120,124,110,110,110,0,112,112,112,112,112,126,126,0
UD 25030 DATA 99,119,127,107,99,99,99,0,115,123,127,127,119,115,115,0,60,118,118,118,126,126,60,0
IL 25032 DATA 126,119,119,127,126,112,112,0,240,0,240,63,240,0,240,255,126,115,115,126,126,119,119,0
RI 25034 DATA 63,120,62,7,127,127,126,0,127,28,28,28,28,28,28,0,115,115,115,115,127,127,62,0
YR 25036 DATA 115,115,115,119,127,62,28,0,99,99,107,127,127,119,99,0,0,0,255,255,0,255,0,0
FG 25038 DATA 115,115,119,62,28,28,28,0,223,223,223,0,251,251,251,0,63,96,192,128,128,192,96,63
EJ 25040 DATA 255,0,0,0,0,0,0,255,252,6,3,1,1,3,6,252,1,144,20,8,81,72,18,0
JM 25042 DATA 0,20,72,162,68,160,5,130
EM 26000 POKE 708,70:POKE 709,104:POKE 710,140:POKE 711,180
KU 26002 POSITION 0,0:? #6;"SCORE  watts  lives";"00000   099      3  "
TR 26005 POSITION 0,3:? #6;"  $###############&    ";"  !                ? r ";"  !              ? e"
YQ 26010 POSITION 0,6:? #6;"  !      ? s ";"  !                ? i ";"  !              ? s "
PJ 26015 POSITION 0,9:? #6;"  !      ? t ";"  !                ? o ";"  !              ? r "
HF 26020 POSITION 0,12:? #6;"  !      ? s ";"  %XXXXXXXXXXXXXX'    ";"             "
IO 26025 POSITION 0,15:? #6;"[illegible]";"[illegible]";"[illegible]"
DA 26030 POSITION 0,18:? #6;"[illegible]";"[illegible]7 6 5 4 3 2 1 0[illegible]  ";"[illegible]"
HN 26035 POSITION 0,21:? #6;"[illegible]";"[illegible]000[illegible]000[illegible]";"[illegible]":POKE 559,46:RETURN
MP 26050 SCR=0:LV=3:WT=99:DI=9:GES=0
BT 26055 RESTORE 26065:FOR T=1 TO 8:READ Z:N(T)=Z:NEXT T
QI 26060 FOR T=1 TO 8:READ Z:P(T)=Z:NEXT T
CD 26065 DATA 1,2,4,8,16,32,64,128,16,14,12,10,8,6,4,2
HA 26070 FOR T=1 TO 8:S(T)=0:NEXT T
TP 26075 TOT=INT(RND(0)*255)+1:T=3*(TOT>99)+4*(TOT>9 AND TOT<100)+5*(TOT<10):POSITION T,22:? #6;TOT
MV 26080 T=INT(RND(0)*11):X=(T*5)+7:Y=0:T=(70*Y+X+287):R=ASC(S$(T,T)):IF R=60 THEN 26080
MD 26085 IF R>207 AND R<216 THEN 26080
DN 26100 RETURN
SJ 26299 REM SCROLL SUBROUTINE
YJ 26300 RESTORE 26310:FOR Z=1536 TO 1596:READ T:POKE Z,T:NEXT Z:RETURN
AN 26310 DATA 104,104,133,204,104,133,203
FR 26315 DATA 162,0,160,0,177,203,157,211,152,232,200,192,13,208,245,138,24,105,7,170,224,180,240,20,234,165,203
SX 26320 DATA 24,233,185,144,2,230,204,165,203,24,105,70,133,203,24,144,214,169,193,141,41,153,169,0,133,77,96
YM 26399 REM DRAW CIRCUIT BOARD
CB 26400 REM
DU 26410 S$(1)="[illegible]":FOR T=1 TO 4:T$="[illegible]A[illegible]_[illegible]A[illegible]_[illegible]A[illegible]_[illegible]A[illegible]_[illegible]A[illegible]_[illegible]A[illegible]_[illegible]"
ZZ 26415 S$(LEN(S$)+1)=T$:NEXT T:FOR T=1 TO 10
RU 26420 T$="CCCCCCJOKCCJOKCCJOKCCJOKCCJOKCCJOKCCJOKCCJOKCCJOKCCJOKCCJOKCCCCCC":S$(LEN(S$)+1)=T$
FU 26425 T$="[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]":S$(LEN(S$)+1)=T$
PC 26430 T$="[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]":S$(LEN(S$)+1)=T$:NEXT T
FY 26435 T$="[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]":S$(LEN(S$)+1)=T$
MR 26440 T$="[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]A[illegible]":S$(LEN(S$)+1)=T$:RETURN
WX 26515 FOR Z=9 TO 64 STEP 5:FOR Z1=4 TO 31 STEP 3:T2=INT(RND(0)*4)+204:T3=Z1*70+Z:S$(T3,T3)=CHR$(T2)
CC 26520 NEXT Z1:NEXT Z
SD 26550 FOR T2=1 TO DI
ZE 26552 T=INT(RND(0)*12):T=(T*5)+8:T1=INT(RND(0)*10):T1=(T1*3)+4:T3=(70*T1+T)
LO 26555 IF S$(T3,T3)="<" THEN 26552
VA 26556 IF ASC(S$(T3,T3))>207 AND ASC(S$(T3,T3))<216 THEN 26552
HH 26560 S$(T3,T3+3)=";<=":NEXT T2
RH 26650 FOR T2=208 TO 215
AN 26652 T=INT(RND(0)*12):T=(T*5)+9:T1=INT(RND(0)*10):T1=(T1*3)+4:T3=(70*T1+T)
MW 26655 IF S$(T3,T3)="<" THEN 26652
XK 26656 IF ASC(S$(T3,T3))>207 AND ASC(S$(T3,T3))<216 THEN 26652
UL 26660 S$(T3,T3)=CHR$(T2):NEXT T2:RETURN
TO 31000 GRAPHICS 17:POKE 708,0:POKE 709,0:POKE 710,0:POKE 711,0:T1=PEEK(560):T2=PEEK(561)
PU 31005 POSITION 3,1:? #6;"antic magazin
```

continued on next page

```
   e":POSITION 6,3:? #6;"presents"
IZ 31010 DL=T1+T2*256:POKE DL+13,7:POKE D
   L+15,2
ST 31015 POSITION 1,8:? #6;"resistors":POSITION 12,10:? #6;"By Chuck Ro
   sko"
QN 31020 POSITION 0,19:? #6;"PRESS start
   TO BEGIN"
XX 31030 POKE 560,T1:POKE 561,T2:POKE 708
   ,104:POKE 708,180:POKE 709,104:POKE 71
   0,0:POKE 711,140
AE 31035 IF PEEK(53279)=6 THEN RETURN
CG 31040 GOTO 31035
```

LISTING 2

```
WF 10 REM RESISTORS, LISTING 2
UP 20 REM BY CHUCK ROSKO
FJ 30 REM (c) 1985,1987 ANTIC PUBLISHING
EV 40 REM (LINES 10-250 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINE 70 AS NECESSARY.)
PR 60 DIM FN$(20),TEMP$(20),AR$(93):DPL=P
   EEK(10592):POKE 10592,255
WO 70 FN$="D:LINES.LST":REM THIS IS THE N
   AME OF THE DISK FILE TO BE CREATED
RD 80 ? "Disk or Cassette?";:POKE 764,25
   5
PY 90 IF  NOT (PEEK(764)=18 OR PEEK(764)=
   58) THEN 90
TH 100 IF PEEK(764)=18 THEN FN$="C:"
VB 110 POKE 764,255:GRAPHICS 0:? "      AN
   TIC'S GENERIC BASIC LOADER"
MY 120 ? ,"BY CHARLES JACKSON"
KB 130 POKE 10592,DPL:TRAP 200
PU 140 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LW 150 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BQ 160 AR$="":READ AR$
YC 170 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DM 180 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")     "
BK 190 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 160
MM 200 IF PEEK(195)=5 THEN ? :? :? "TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CM 210 IF C<LN+1 THEN ? :? "TOO FEW DATA
   LINES!":? "CANNOT CREATE FILE!":END
UQ 220 IF FN$="C:" THEN ? :? " Prepare ca
   ssette, press [RETURN]"
AR 230 OPEN #1,8,0,FN$
PV 240 POKE 766,1:? #1;A$;:POKE 766,0
AL 250 CLOSE #1:GRAPHICS 0:? "COMPLETED
   "
EI 1000 DATA 120
NO 1010 DATA 0490480480530320850610850830
   82040065068082040034104169000133020133
   019105001232142024208142010
VS 1020 DATA 2121970192082450960340410410
   580070079082032090061048032084079032051
   058083079085078068032090044
MG 1030 DATA 0480440480440480580780690880
   84032090155049057048049048032090090036
   061034104104133204104133203
OK 1040 DATA 1041332061041332051620041600
   00177203145205136208249230204230206202
   208240096034155
```

antic imports britain's best

GRAPHICS IMPOSSIBLE

Article on page 33

LISTING 1

Don't type the TYPO II Codes!

```
EI 1 REM *******************************
XH 2 REM *      GRAPHICS 8/9 DEMO      *
LR 3 REM *             by              *
EX 4 REM *          PAUL LAY           *
EC 5 REM * --------------------------- *
IZ 6 REM *  PAGE 6 MAGAZINE - ENGLAND  *
EO 7 REM *******************************
NY 10 REM MACHINE CODE FOR DLI
OU 20 DATA 72,138,72,152,72,169,0
VG 30 DATA 160,64,162,160,141,10,212
OU 40 DATA 141,27,208,224,160,240,1
QI 50 DATA 234,224,66,240,2,133,203
FA 60 DATA 133,203,234,234,234,234,140
BH 70 DATA 27,208,202,208,227,141,10
VO 80 DATA 212,141,27,208,104,168,104
YT 90 DATA 170,104,64
YL 100 FOR I=1536 TO 1587:READ J
KM 110 POKE I,J:NEXT I
ZC 120 REM ALLOW ACCESS TO GR.8 & GR.9
SB 130 GR8=150:GR9=170:GOTO 180
TV 140 REM ACCESS GR.8
EJ 150 POKE 87,8:RETURN
US 160 REM ACCESS GR.9
FA 170 POKE 87,9:RETURN
LS 180 GRAPHICS 8:POKE 752,1
WD 190 POKE 512,0:POKE 513,6
FM 200 DL=PEEK(560)+256*PEEK(561)
UT 210 POKE DL+2,PEEK(DL+2)+128
OI 220 POKE 54286,192
XQ 230 REM DEMONSTRATION PROGRAM
YE 240 REM (Random Graphs)
GR 250 DIM P(8)
AI 260 FOR I=0 TO 7:READ J:P(I)=J:NEXT I
XE 270 DATA 128,64,32,16,8,4,2,1
OW 280 POKE 709,12:POKE 710,0:POKE 712,20
   8
DF 290 GOSUB GR8:COLOR 1
YP 300 PLOT 27,0:DRAWTO 27,159
ZZ 310 PLOT 28,0:DRAWTO 28,159
BQ 320 FOR Y=1 TO 19:PLOT 25,162-8*Y
PW 330 DRAWTO 26,162-8*Y
LW 340 N=Y:XP=16-8*(N>9):YP=158-8*Y
HI 350 GOSUB 510:NEXT Y
JI 360 ? "0";CHR$(19);:FOR X=1 TO 16
FT 370 ? CHR$(18);CHR$(23);:NEXT X:?
EA 380 ? " 0 1 2 3 4 5 6 7 8 9 1 1 1 1 1
   1 1"
GV 390 ? "                    0 1 2 3 4
   5 6"
UC 400 GOSUB GR9
UL 410 FOR C=1 TO 15:COLOR C
ZJ 420 H=140*RND(0)
RB 430 FOR W=0 TO 3
HD 440 PLOT 7+4*C+W,159:DRAWTO 7+4*C+W,H
FY 450 NEXT W:NEXT C
CP 460 V=14:POKE 764,255
YJ 470 IF PEEK(764)=255 THEN SOUND 0,200,
   2,V:V=V-0.25+14*(V=0):GOTO 470
GN 480 SOUND 0,0,0,0:COLOR 0
FB 490 FOR X=11 TO 79:PLOT X,159:DRAWTO X
   ,0:NEXT X
MZ 500 GOTO 410
FK 510 C=8*(ASC(STR$(N))-32)
JJ 520 FOR I=0 TO 7:B=PEEK(57344+C+I)
PB 530 FOR J=0 TO 7
EX 540 IF B-P(J)>-1 THEN B=B-P(J):PLOT XP
   +J,YP+I
EX 550 NEXT J:NEXT I
UM 560 IF N>9 THEN N=N-10*INT(N/10):XP=XP
   +8:GOTO 510
ZP 570 RETURN
```

LISTING 2

```
0100 ;GRAPHICS 8/9 DEMO, SOURCE
0110 ;BY PAUL LAY
0120 ;(FROM PAGE 6 MAGAZINE, ENGLAND)
0130 PRIOR = $D01B
0140 WSYNC = $D40A
0150       *=  $0600
0160       PHA
0170       TXA
0180       PHA
0190       TYA
0200       PHA
```

```
0210        LDA #$00
0220        LDY #$40
0230        LDX #$A0        ; Loop over
                              160 scans
0240 ;
0250 LOOP
0260        STA WSYNC
0270        STA PRIOR       ; Disable GTIA
0280        CPX #$A0
0290        BEQ SKIP1       ; First LMS ?
0300 ;
0310        NOP
0320 SKIP1
0330        CPX #$42        ; Second LMS ?
0340        BEQ SKIP2
0350 ;
0360        STA $CB         ; Three cycle
0370 ;                        delay !
0380 SKIP2
0390        STA $CB         ; Three cycle
0400 ;                        delay !
0410        NOP
0420        NOP
0430        NOP
0440        NOP
0450        STY PRIOR       ; Enable GTIA #9
0460        DEX
0470        BNE LOOP
0480 ;
0490        STA WSYNC
0500        STA PRIOR       ; Disable GTIA
0510        PLA
0520        TAY
0530        PLA
0540        TAX
0550        PLA
0560        RTI
```

LISTING 3

```
JV| 2 REM MULTIPLE PLAYER DEMO
HT| 4 REM BY PAUL LAY
FD| 6 REM (FROM PAGE 6 MAGAZINE - ENGLAND
NY| 10 REM MACHINE CODE FOR DLI
PX| 20 DATA 72,138,72,162,192,165,203
LP| 30 DATA 141,10,212,141,0,208,224
CL| 40 DATA 192,240,1,234,224,98,240
JZ| 50 DATA 2,165,204,165,204,234,234
YM| 60 DATA 234,234,234,141,0,208,202
HA| 70 DATA 208,224,104,170,104,64
KZ| 80 FOR I=1536 TO 1576:READ J
RE| 90 POKE I,J:NEXT I
DS| 100 REM SET UP DISPLAY
XK| 110 GRAPHICS 24
VP| 120 POKE 709,6:POKE 710,0
FR| 130 DL=PEEK(560)+256*PEEK(561)
JO| 140 POKE DL+2,240
EP| 150 COLOR 1:FOR I=1 TO 40
TS| 160 DRAWTO 319*RND(0),191*RND(0)
GF| 170 NEXT I
AU| 180 REM SET UP PLAYER GRAPHICS
IU| 190 PM=PEEK(106)-40
EH| 200 POKE 559,62:POKE 54279,PM
EP| 210 POKE 53277,3:POKE 623,1
XT| 220 DIM T$(20)
RB| 230 POKE 704,14:POKE 53248,124
AZ| 240 T$="THIS IS PLAYER ZERO"
EY| 250 STRT=1068
SR| 260 GOSUB 500
AU| 270 POKE 705,142:POKE 53249,112
NA| 280 T$(16)="ONE":STRT=1328
SX| 290 GOSUB 500
RW| 300 POKE 706,206:POKE 53250,120
DG| 310 T$(16)="TWO":STRT=1584
SK| 320 GOSUB 500
SP| 330 POKE 707,62:POKE 53251,128
CU| 340 T$(16)="THREE":STRT=1840
SQ| 350 GOSUB 500
ZB| 360 POKE 53252,142:POKE 53253,140
MI| 370 POKE 53254,138:POKE 53255,136
EW| 380 T$="THIS IS ALL MISSILES":STRT=816
SY| 390 GOSUB 500
VO| 400 POKE 512,0:POKE 513,6
OI| 410 POKE 54286,192
VH| 420 REM MOVE BOTH INCARNATIONS OF
QF| 430 REM PLAYER #0
CB| 440 FOR I=122 TO 48 STEP -1
EZ| 450 POKE 203,I:POKE 204,245-I
AE| 460 FOR J=1 TO 5:NEXT J:NEXT I
QP| 470 FOR I=48 TO 122
FF| 480 POKE 203,I:POKE 204,245-I
LS| 490 FOR J=1 TO 5:NEXT J:NEXT I:GOTO 44
  | 0
IM| 500 FOR I=1 TO LEN(T$):FOR J=0 TO 7
YM| 510 POKE 256*PM+STRT+8*I+J,PEEK(57344+
  | 8*(ASC(T$(I))-32)+J)
ER| 520 NEXT J:NEXT I
ZH| 530 RETURN
```

LISTING 4

```
0100 ;MULTIPLE PLAYER DEMO, SOURCE
0110 ;BY PAUL LAY
0120 ;(FROM PAGE 6 MAGAZINE, ENGLAND)
0130 HPOSP0 = $D000
0140 WSYNC = $D40A
0150        *=  $0600
0160        PHA
0170        TXA
0180        PHA
0190        LDX #$C0        ; Loop over
0200 ;                        192 scans
0210 LOOP
0220        LDA $CB         ; First position
0230        STA WSYNC
0240        STA HPOSP0
0250        CPX #$C0        ; First LMS ?
0260        BEQ SKIP1
0270 ;
0280        NOP
0290 SKIP1
0300        CPX #$62        ; Second LMS ?
0310        BEQ SKIP2
0320 ;
0330        LDA $CC         ; Three cycle
0340 ;                        delay !
0350 SKIP2
0360        LDA $CC         ; Second position
0370        NOP
0380        NOP
0390        NOP
0400        NOP
0410        NOP
0420        STA HPOSP0
0430        DEX
0440        BNE LOOP
0441 ;
0450        PLA
0460        TAX
0470        PLA
0480        RTI
```

ST RESOURCE

ANTIC PROMPTER ST

Article on page 52

LISTING 1

```
' Anticprompter!
' Another almost practical application
' (c)1987 Antic Publishing
' Written by Patrick Bass
Let Version$="062487"
'
' - - - - - - - - - - - - - - - - - - - -
@Initialize
'
Repeat
  @Open_quiz_file
  @Read_the_file
```

continued on next page

```
 '
 Alert 3,"Prompt another text file?",2,"Yes| No ",Button
 '
 If Button=2
   Let Finished=True
 Endif
 '
Until Finished
Edit
End
'
' ------------------------------------
Procedure Initialize
 '
 Deftext ,,,13
 Let Medium_resolution=1
 Let High_resolution=2
 '
 Let Screenbase%=Xbios(2)
 '
 Let The_current_resolution=Xbios(4)
 Let Rez=The_current_resolution
 Let Textbase=(180*The_current_resolution)
 '
 If The_current_resolution<Medium_resolution
   Alert 3,"Please switch to|medium resolution.",1,"Hokay",Button
   System
 Endif
 '
 If The_current_resolution=Medium_resolution
   Let Scroll_amount=(193*160)
   Let Lines_to_scroll=30
 Endif
 If The_current_resolution=High_resolution
   Let Scroll_amount=(193*160)
   Let Lines_to_scroll=15
 Endif
 '
 Let Charw=8
 Let Charh=(8*The_current_resolution)
 '
 Let Escape$=Chr$(27)
 Let Bell$=Chr$(7)
 Let Reverse_on$=Escape$+"p"
 Let Reverse_off$=Escape$+"q"
 '
 Let Finished=False
 '
 Dim Z$(10)
Return
'
' ------------------------------------
Procedure Open_quiz_file
 '
 Deftext ,,,13
 Print At(29,2);"                      "
 Print At(29,3);" Load Teleprompt File "
 Print At(29,4);"                      "
 Box (28*Charw),(1*Charh),(50*Charw),4*Charh
 Print At(1,6)
 Print "                    "
 Print " You need to load   "
 Print " a file containing  "
 Print "  the prompt text   "
 Print "from the disk into  "
 Print "the computer so you "
 Print "    may show it.    "
 Print "                    "
 Print " Either clickselect "
 Print "  or type in the    "
 Print " filename  of the   "
 Print " file you wish to   "
 Print "       open.        "
 Print "                    "
 Box 0,(6*Charh),(20*Charw),(20*Charh)
 '
 @Prompt_action
 Fileselect "\*.*","",Filename$
 '
Return
'
' ------------------------------------
Procedure Prompt_action
 Let Prompt_offset=61
 '
 Print At(Prompt_offset,16);"                   "
 Print At(Prompt_offset,17);"  Select a file    "
 Print At(Prompt_offset,18);"  and press [ OK ] "
 Print At(Prompt_offset,19);" <----------       "
 Print At(Prompt_offset,20);"  Or press [Cancel]"
 Print At(Prompt_offset,21);"  to abort action. "
 Print At(Prompt_offset,22);"                   "
 Box (Prompt_offset-1)*Charw,(15*Charh),
     (Prompt_offset+18)*Charw,(22*Charh)
Return
'
' ------------------------------------
Procedure Read_the_file
 '
 If Exist(Filename$)
   Cls
   Open "I",#1,Filename$
   Let Lf=Lof(#1)
   @Scroll_the_screen_up
   Deftext ,,,32
   Text 1,Textbase,Filename$
   Deftext ,,,13
   @Scroll_the_screen_up
   '
   Repeat
     '
     Let A$=Inkey$
     If A$<>""
       If A$>="0" And A$<="9"
         Let Display_speed=(Val(A$)*10)
       Endif
     Endif
     '
     Let Raw_input_line$=""
     Line Input #1,Raw_input_line$
     '
     @Format_new_line
     '
     Let Lf=(Lf-Len(Raw_input_line$)-3)
     '
   Until Lf<0 Or Mousek
   '
   Close #1
   '
   For I=1 To 12
     If Mousek
       Let I=13
     Endif
     Pause Display_speed
     @Scroll_the_screen_up
   Next I
 Endif
 '
Return
'
' ------------------------------
Procedure Format_new_line
 '
 Let Z$=""
 Let Letter_index=1
 '
 Repeat
   @Get_next_word
   '
   If Len(Z$+New_word$)>40
     Pause Display_speed
     @Scroll_the_screen_up
     Deftext ,,,32
     Text 1,Textbase,Left$(Z$,40)
     Deftext ,,,13
     Let Z$=New_word$
   Else
     Let Z$=Z$+New_word$
   Endif
   '
 Until Letter_index>Len(Raw_input_line$)
 '
 Pause Display_speed
 @Scroll_the_screen_up
 Deftext ,,,32
 Text 1,Textbase,Z$
 Deftext ,,,13
 '
Return
'
' ------------------------------
Procedure Get_next_word
 Let New_word$=""
 Let Adding_letters=True
 '
 While Adding_letters
   '
   Let X$=Mid$(Raw_input_line$,Letter_index,1)
   Inc Letter_index
   '
   If X$=" " Or X$=Chr$(13) Or Letter_index>120
     Let Adding_letters=False
   Endif
   '
   Let New_word$=New_word$+X$
 Wend
 '
 If Len(New_word$)>40
   Pause Display_speed
   @Scroll_the_screen_up
   Deftext ,,,32
   Text 1,Textbase,Left$(New_word$,39)
   Deftext ,,,13
   '
   Let New_word$=Mid$(New_word$,40)
   '
 Endif
Return
'
' ------------------------------------
Procedure Scroll_the_screen_up
 For Li=0 To Lines_to_scroll
   Bmove Screenbase%+160,Screenbase%,Scroll_amount
 Next Li
Return
```

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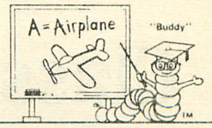
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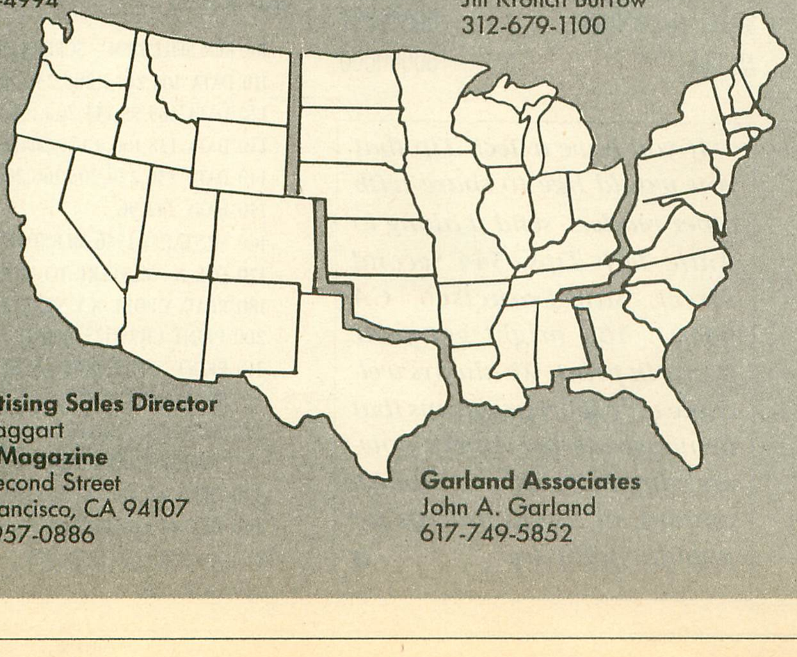
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Tech Tips

LOOP TOGGLE

This routine from Ken Cox of Fayetteville, Arkansas lets you toggle a programming loop with the [SPACEBAR] key:

```
10 FOR DELAY=1 TO 200:NEXT DELAY
100 REM START ROUTINE
110 IF PEEK(764)=33 THEN POKE 764,255:
CLOSE #2:OPEN #2,4,0,"K:":GET #2,KEY:
CLOSE #2
120 REM END ROUTINE
130 PRINT "WHAT A TIP!"
140 GOTO 10
```

SINGLE KEY INPUT ROUTINE

Carl Evans says he uses this neat little routine in just about every BASIC program he writes. You will find that it provides quite a programming convenience when you want to use a single key to answer a prompt or a question displayed on the screen. Subroutine KEY.LST simply tells the computer to wait for the operator to press a key on the keyboard. Upon RETURN from the subroutine, you will have the ATASCII value of the character, corresponding to the key that was pressed, stored in KEY. Here's the subroutine:

```
20440 REM KEY.LST
20441 OPEN #6,4,0,"K:"
20442 GET #6,KEY
20443 REM PUT SPECIAL EXIT #1 HERE
20444 REM PUT SPECIAL EXIT #2 HERE
20445 CLOSE #6:RETURN
```

Essentially, this routine OPENs the keyboard as a "device," just as if it was a printer or disk drive. In this particular routine the device number is 6. If the program you want to put this routine into is already using this device number for something else, you can change it to 4, 5, or some other legal number. Avoid using device 0 or 7, because the operating system uses them and results could be unpredictable. The screen editor uses device 0, and 7 is used by LIST, LOAD, PRINT and RUN. Caution: always CLOSE a device when you are through with it.

When this routine is called, the ATASCII code for the key you hit is stored in the variable KEY. Any special exit conditions must test KEY against the proper ATASCII codes.

AUTOBOOT SANS BASIC

This self-booting routine disables XL/XE internal BASIC and frees 8K of RAM. It does *not* disable external cartridges, disturb Atari 400s or 800s or require re-execution when you press [RESET], nor will it execute if BASIC is already disabled. This tip comes from Chris Richardson oF Warren, Indiana. When RUN, this file creates BASDIS.EXE, which you can rename to AUTORUN.SYS.

```
10 OPEN #1,8,0,"D:BASDIS.EXE"
20 FOR Z=1 TO 90:READ D:PUT #1,D:CK=CK+D:NEXT Z
30 IF CK<>8790 THEN ?:?"CHECK TYPING OF DATA STATEMENTS"
40 CLOSE#1:END
1000 DATA 255,255,0,6,77,6,173,31,208,41,4,240,68,173,19,208,208,63,173,248
     ,3,208,58
1001 DATA 173,1,211,9,2,141,1,211,169,192,133,106
1002 DATA 141,248,3,169,12,141,66,3,162,0,32,86
1003 DATA 228,169,3,141,66,3,169,12,141,74,3,169,6,141,69,3,169,76,141,68,3
1004 DATA 169,2,141,72,3,162,0,142,73,3,32,86,228,96,69,58,226,2,227,2,0,6
```

FUNCTION KEY VALUE CHART

You can use this handy chart by Carl Evans to help your program keep track of which console key is being pressed.

Keys Pressed	PEEK(53279)	Binary Code
None	7	00000111
START	6	00000110
SELECT	5	00000101
START and SELECT	4	00000100
OPTION	3	00000011
START and OPTION	2	00000010
SELECT and OPTION	1	00000001
All Three	0	00000000

If you have a Tech Tip that you would like to share with other readers, send it along to Antic Tech Tips, 544 Second Street, San Francisco, CA 94107. You might get your name in print. We always welcome very short programs that demonstrate the Atari's powers, simple hardware modifications, or useful macros for popular software. ■

INSTANT SCREEN FILL

Instantly filling your screen with a character is an old programming trick. Here's how Carl Evans, author of *Atari BASIC, Faster and Better*, does it on the 8-bit Atari.

The DATA statements in lines 110-150 contain the decimal number "translation" of a 34-byte USR routine. Lines 170-180 put the values into the first 34 bytes of Page Six—a 256-byte block of memory starting at location 1536 ($0600) which BASIC and DOS leave free for your use. The screen fill routine is relocatable, so you can replace the addresses in line 160. Just make sure that the location is safe and the value of MLEND is 33 more than MLSTART.

```
100 REM SFILL.DEM—SCREEN FILL FROM BASIC
110 DATA 104,201,1,208,254,104,104,170
120 DATA 165,88,133,204,165,89,133,205
130 DATA 138,160,0,145,204,230,204,208
140 DATA 250,230,205,166,205,224,160,208
150 DATA 242,96
160 MLSTART=1536:MLEND=1569
170 FOR X=MLSTART TO MLEND
180 READ Y:POKE X,Y:NEXT X
200 PRINT CHR$(125):PRINT
210 PRINT "SFILL.DEM—SCREEN FILL
    FROM BASIC"
220 PRINT:PRINT:PRINT
    "ENTER CHARACTER: ";
230 OPEN #2,4,0,"K:":TRAP 230
240 GET #2,KEY:CLOSE #2
250 X=USR(1536,KEY-32)
260 GOTO 260
```

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Turn your Atari ST into a sizzling digitized drum machine with Digi-Drum. From the cool syncopated beat of a jazz improvisation to the martial flare of a staccato snare, you can experience it all, digitally, with this amazing program. Also Digi-Drum is compatible with the sound digitizer ST-Replay (see above).

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Arcade fun!

Airball

Now you're really in trouble said the Evil Wizard, "I'm turning you into a ball and sending you into a mansion with over 250 rooms!!



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In the rooms you'll have to pick up objects that have been left behind, such as crosses, tins of beans, a Buddha, and a dragon statue. At the end of the maze is a spell book that will turn you back into a human again. "Sounds easy" you say to the wizard, as he laughs and says, "there is much more in store for you!"

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